

# CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

## CENTRAL VALLEY REGION

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**ORDER NO. R5-2010-  
NPDES NO. CA0077682**

### WASTE DISCHARGE REQUIREMENTS FOR THE SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT SACRAMENTO COUNTY

The following Discharger is subject to waste discharge requirements as set forth in this Order:

**Table 1. Discharger Information**

<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified this discharge as a major discharge.	

The discharge by the **Sacramento Regional County Sanitation District** from the discharge points identified below is subject to waste discharge requirements as set forth in this Order:

**Table 2. Discharge Location**

<b>Discharge Point</b>	<b>Effluent Description</b>	<b>Discharge Point Latitude</b>	<b>Discharge Point Longitude</b>	<b>Receiving Water</b>
001	Domestic Wastewater	38° 27' 15" N	121° 30' 00" W	Sacramento River

**Table 3. Administrative Information**

This Order was adopted by the Regional Water Quality Control Board on:	<b>&lt;Adoption Date&gt;</b>
This Order shall become effective on:	<b>&lt;Effective Date&gt;</b>
This Order shall expire on:	<b>&lt;Expiration Date&gt;</b>
The Discharger shall file a Report of Waste Discharge in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	<b><u>3 years prior to the Order expiration date</u></b>

I, **Pamela C. Creedon**, Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on **<Adoption Date>**.

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**Pamela C. Creedon**, Executive Officer

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## I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order:

**Table 4. Facility Information**

<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant, Elk Grove
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento
<b>Facility Contact, Title, and Phone</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Mailing Address</b>	10060 Goethe Road, Sacramento, CA 95827
<b>Type of Facility</b>	Publicly Owned Treatment Works
<b>Facility Design Flow</b>	181 MGD

## II. FINDINGS

The California Regional Water Quality Control Board, Central Valley Region (hereinafter Central Valley Water Board), finds:

**A. Background.** Sacramento Regional County Sanitation District (hereinafter Discharger) is currently discharging pursuant to Order No. 5-00-188 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0077682. The Discharger submitted a Report of Waste Discharge, dated 1 February 2005, and applied for a NPDES permit renewal to discharge up to 218 mgd of treated wastewater from Sacramento Regional Wastewater Treatment Plant, hereinafter Facility. In June 2010, the Discharger withdrew its request to increase the treatment plant capacity from 181 mgd to 218 mgd. The application was deemed complete on 24 August 2010.

For the purposes of this Order, references to the “discharger” or “permittee” in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

The Discharger provides sewerage service to the Cities of Sacramento, Folsom, West Sacramento, and the Sacramento Area Sewer District service area. The Sacramento Area Sewer District service area includes the Cities of Elk Grove, Rancho Cordova, Citrus Heights, as well as, portions of the unincorporated areas of Sacramento County. The population served is approximately 1.3 million people. The Discharger owns and operates the main trunk lines/interceptors feeding the Facility. The smaller diameter collection systems are owned and operated by the various contributing agencies and not by the Discharger. This Order regulates the Facility and portions of the collection system operated and maintained by the Discharger only. The remaining collection systems that feed the Facility are regulated under the State Water Resources Control Board’s Water Quality Order No. 2006-0003.

The Facility is contracted to accept 60 mgd of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows are managed by the Combined Wastewater Collection and Treatment System (CWCTS) operated by the City of Sacramento. The CWCTS is governed by Waste Discharge Requirements Order No.R5-2010-0004 (NPDES No. CA0079111). Depending on treatment and conveyance capacity, flow in excess of 60 mgd maybe received at the Facility.

- B. Facility Description.** The Discharger owns and operates the Facility, a Publicly Owned Treatment Works (POTW). The treatment system consists of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, secondary clarification, chlorine disinfection with dechlorination and a diffuser for river discharge. Solids handling consists of dissolved air flotation thickeners, anaerobic digesters and sludge stabilization basins with disposal on-site through land application or biosolids recycling facility. Wastewater is discharged from Discharge Point No. 001 (see table on cover page) to the Sacramento River at Freeport, a water of the United States, and within the legal boundaries of the Sacramento – San Joaquin Delta. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

The Discharger currently provides 5.0 MGD of treated wastewater to the Water Reclamation Facility (WRF). The WRF is regulated under the Master Reclamation Permit No. 97-146 and provides recycled water for landscape irrigation and wastewater treatment plant process water.

- C. Legal Authorities.** This Order is issued pursuant to section 402 of the Clean Water Act (CWA) and implementing regulations adopted by USEPA and chapter 5.5, division 7 of the California Water Code (CWC; commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to Article 4, Chapter 4, Division 7 of the CWC (commencing with section 13260).
- D. Background and Rationale for Requirements.** The Central Valley Water Board developed the requirements in this Order based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for Order requirements, is hereby incorporated into this Order and constitutes part of the Findings for this Order. Attachments A through K are also incorporated into this Order.
- E. California Environmental Quality Act (CEQA).** Under CWC section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21100-21177.
- F. Technology-based Effluent Limitations.** Section 301(b) of the CWA and implementing USEPA permit regulations at section 122.44, title 40 of the Code of Federal Regulations (40 CFR 122.44), require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge

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authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133. A detailed discussion of the technology-based effluent limitations development is included in the Fact Sheet.

**G. Water Quality-Based Effluent Limitations (WQBELs).** Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as water quality-based requirements that are necessary to achieve water quality standards. The Regional Water Board previously considered the factors listed in CWC section 13241 in establishing these requirements in Order No. R5-2005-0074. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements, is discussed in the Fact Sheet.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

**H. Water Quality Control Plans.** The Central Valley Water Board adopted a *Water Quality Control Plan, Fourth Edition (Revised September 2009)*, for the Sacramento and San Joaquin River Basins (hereinafter Basin Plan) on 9 December 1994 that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Discharge to 001 is within the legal boundaries of the Sacramento-San Joaquin Delta. Beneficial uses applicable to the Sacramento –San Joaquin Delta are as follows:

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**Table 5. Basin Plan Beneficial Uses**

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	<b>Sacramento – San Joaquin Delta</b>	<u>Existing:</u> Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation, including canoeing and rafting (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV).
NA	<b>Groundwater</b>	Municipal and domestic water supply (MUN); Agricultural supply (AGR); Industrial service supply (IND); and Industrial process supply (PRO).

The Basin Plan includes a list of Water Quality Limited Segments (WQLSs), which are defined as “...those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR 130, et seq.).” The Basin Plan also states, “Additional treatment beyond minimum federal standards will be imposed on dischargers to WQLSs. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.” The Delta is listed as a WQLS for Chlorpyrifos, DDT, Diazinon, Exotic Species, Group A Pesticides, Mercury, Polychlorinated byphenyls (PCBs) and unknown toxicity in the 303(d) list of impaired water bodies.

The State Water Board adopted the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan) on 18 May 1972, and amended this plan on 18 September 1975. This plan contains temperature objectives for surface waters. Requirements of this Order implement the Thermal Plan.

The Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) was adopted on 13 December 2006 by the State Water Board superseding the May 1995 and the 1991 Bay-Delta Plan. The Bay-Delta Plan identifies the beneficial uses of the estuary and includes objectives for flow, salinity, and endangered species protection.

The Bay-Delta Plan attempts to create a management plan that is acceptable to the stakeholders while at the same time is protective of beneficial uses of the Sacramento – San Joaquin Delta. The State Water Board adopted Decision 1641 (D-1641) on 29 December 1999. D-1641 implements flow objectives for the Bay-Delta Estuary, approves a petition to change points of diversion of the Central Valley Project and the

State Water Project in the Southern Delta, and approves a petition to change places of use and purposes of use of the Central Valley Project. The water quality objectives of the Bay-Delta Plan are implemented as part of this Order.

The Sacramento River at Freeport is within the designated critical habitat for five federally-listed fish species including winter- and spring-run Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), delta smelt (*Hypomesus transpacificus*) and green sturgeon (*Acipenser medirostris*). Other listed wildlife species that feed on Central Valley fishes include the California Least Tern (*Stenula antillarum brownie*) and the Giant Garter snake (*Thamnopsis gigas*). In addition to the federally-listed species the California State Species of Special Concern include the Sacramento Splittail (*Pogonichthys macrolepidotus*) and the Central Valley Fall/Late-Fall Salmon (*Oncorhynchus tshawytscha*).

Requirements of this Order specifically implement the applicable Water Quality Control Plans.

The Central Valley Water Board adopted Resolution No. R5-2007-0161, Water Board's Actions to Protect Beneficial Uses of the San Francisco Bay/Sacramento- San Joaquin Delta Estuary on 6 December 2007. The purpose of the resolution is to identify and implement actions needed to protect the San Francisco/San Joaquin Delta beneficial uses. Some actions include exercising the State Water Board's water rights authority over water right decisions and exercising the San Francisco Bay Regional Water Quality Control Board's and Central Valley Water Board's authority over controlling water quality in the Delta.

- I. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on 22 December 1992, and later amended it on 4 May 1995 and 9 November 1999. About 40 criteria in the NTR applied in California. On 18 May 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that were applicable in the state. The CTR was amended on 13 February 2001. These rules contain water quality criteria for priority pollutants.
- J. **State Implementation Policy.** On 2 March 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Policy or SIP). The SIP became effective on 28 April 2000 with respect to the priority pollutant criteria promulgated for California by USEPA through the NTR and to the priority pollutant objectives established by the Central Valley Water Board in the Basin Plan. The SIP became effective on 18 May 2000 with respect to the priority pollutant criteria promulgated by USEPA through the CTR. The State Water Board adopted amendments to the SIP on 24 February 2005 that became effective on 13 July 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

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**K. Compliance Schedules and Interim Requirements.** In general, an NPDES permit must include final effluent limitations that are consistent with CWA section 301 and with 40 CFR 122.44(d). There are exceptions to this general rule. The State Water Board has concluded that where the Regional Water Board's Basin Plan allows for schedules of compliance and the Regional Water Board is newly interpreting a narrative standard, it may include schedules of compliance in the permit to meet effluent limits that implement a narrative standard. See *In the Matter of Waste Discharge Requirements for Avon Refinery* (State Water Board Order WQ 2001-06 at pp. 53-55). See also *Communities for a Better Environment (CBE) et al. v. State Water Resources Control Board*, 34 Cal.Rptr.3d 396, 410 (2005). The Basin Plan for the Sacramento and San Joaquin Rivers includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives that are adopted after the date of adoption of the Basin Plan, which was 25 September 1995 (see Basin Plan at page IV-16). Consistent with the State Water Board's Order in the CBE matter, the Regional Water Board has the discretion to include compliance schedules in NPDES permits when it is including an effluent limitation that is a "new interpretation" of a narrative water quality objective. This conclusion is also consistent with USEPA policies and administrative decisions. See, e.g., *Whole Effluent Toxicity (WET) Control Policy*. The State Water Board's *Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits* (Compliance Schedule Policy) allows compliance schedules for new, revised, or newly interpreted water quality objectives or criteria, or in accordance with a TMDL. All compliance schedules must be as short as possible, and may not exceed 10 years from the effective date of the adoption, revision, or new interpretation of the applicable water quality objective or criterion, unless a TMDL allows a longer schedule. The Regional Water Board, however, is not required to include a compliance schedule of compliance, but may issue a Time Schedule Order pursuant to CWC section 13300 or a Cease and Desist Order pursuant to CWC section 13301 where it finds that the discharger is violating or threatening to violate the permit. The Regional Water Board will consider the merits of each case in determining whether it is appropriate to include a compliance schedule in a permit, and, consistent with the Basin Plan Compliance Schedule Policy, should consider feasibility of achieving compliance, and must impose a schedule that is as short as practicable possible to achieve compliance with the objectives, criteria, or effluent limitation based on the objective or criteria.

Section 2.1 of the SIP provides that, based on a Discharger's request and demonstration that it is infeasible for an existing Discharger to achieve immediate compliance with an effluent limitation derived from a CTR criterion, compliance schedules may be allowed in an NPDES permit. Unless an exception has been granted under section 5.3 of the SIP, a compliance schedule may not exceed 5 years from the date that the permit is issued or reissued, nor may it extend beyond 10 years from the effective date of the SIP (or 18 May 2010) to establish and comply with CTR criterion-based effluent limitations. The Compliance Schedule Policy and the SIP do not allow compliance schedules for priority pollutants beyond 18 May 2010, except for new or more stringent priority pollutant criteria adopted by USEPA after 17 December 2008.

Where a compliance schedule for a final effluent limitation exceeds 1 year, the Order must include interim numeric limitations for that constituent or parameter, interim

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milestones and compliance reporting within 14 days after each interim milestone. The permit may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures. Where allowed by the Basin Plan, compliance schedules and interim effluent limitations or discharge specifications may also be granted to allow time to implement a new or revised water quality objective. This Order does include compliance schedules and interim effluent limitations. A detailed discussion of the basis for the compliance schedules and interim effluent limitations is included in the Fact Sheet (Attachment F).

- L. Alaska Rule.** On 30 March 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards become effective for CWA purposes. (40 CFR 131.21 and 65 FR 24641 (27 April 2000).) Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after 30 May 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by 30 May 2000 may be used for CWA purposes, whether or not approved by USEPA.
- M. Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for 5-day biochemical oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) and pH. The WQBELs consist of restrictions on ammonia, copper, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl) phthalate, 1,2-diphenyl-hydrazine, dibenzo(ah)anthracene, N-nitrosodimethylamine, aluminum, nitrate plus nitrite, nitrite, manganese, methyl tertiary butyl ether, mercury, chlorine residual and chlorpyrifos. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes water quality based effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS to meet numeric objectives or protect beneficial uses.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless "*applicable water quality standards for purposes of the [Clean Water] Act*" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the technology-based requirements of the CWA and the applicable water quality standards for purposes of the CWA.

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- N. Antidegradation Policy.** 40 CFR 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Central Valley Water Board's Basin Plan implements, and incorporates by reference, both the state and federal antidegradation policies. As discussed in detail in the Fact Sheet, the permitted discharge is consistent with the antidegradation provision of 40 CFR 131.12 and Resolution No. 68-16.
- O. Anti-Backsliding Requirements.** Sections 303(d)(4) and 402(o)(2) of the CWA and federal regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions. Some effluent limitations in this Order are less stringent than those in Order No. 5-00-188. As discussed in detail in the Fact Sheet, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.
- P. Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state. The discharger is responsible for meeting all requirements of the applicable Endangered Species Act.
- Q. Monitoring and Reporting.** 40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. CWC sections 13267 and 13383 authorize the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The Monitoring and Reporting Program is provided in Attachment E.
- R. Standard and Special Provisions.** Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42. The Central Valley Water Board has also included in this Order special provisions applicable to the Discharger. A rationale for the special provisions contained in this Order is provided in the Fact Sheet.
- S. Provisions and Requirements Implementing State Law.** The provisions/requirements in sections **IV.B**, **IV.C**, **V.B**, and **VI.C.4.c** of this Order are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these

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provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

- T. Notification of Interested Parties.** The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.
- U. Consideration of Public Comment.** The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet.

**THEREFORE, IT IS HEREBY ORDERED**, that Order No. 5-00-188 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the CWC (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

### III. DISCHARGE PROHIBITIONS

- A.** Discharge of wastewater at a location or in a manner different from that described in the Findings is prohibited.
- B.** The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by Federal Standard Provisions I.G. and I.H. (Attachment D).
- C.** Neither the discharge nor its treatment shall create a nuisance as defined in section 13050 of the CWC.
- D.** The Discharger shall not allow pollutant-free wastewater to be discharged into the collection, treatment, and disposal system in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.
- E.** Discharge to the Sacramento River is prohibited when the Sacramento River flow is less than 1300 cubic feet per second (cfs).
- F.** Discharge to the Sacramento River is prohibited when there is less than a 14:1 (river:effluent) flow ratio available in the Sacramento River.
- G.** The discharge or storage of waste classified as 'hazardous' or 'designated', as defined in Section 2521(a) and 2522(a) of Title 27, is prohibited.

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## IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

### A. Effluent Limitations – Discharge Point No. 001

#### 1. Final Effluent Limitations – Discharge Point No. 001

- a. The Discharger shall maintain compliance with the following effluent limitations specified in Table 6:

**Table 6. Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
Total Suspended Solids	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
pH	standard units	--	--	--	6.5	8.5
Priority Pollutants						
Bis(2-ethylhexyl)phthalate	µg/L	--	--	13	--	--
Carbon Tetrachloride	µg/L	--	--	5.3	--	--
Chlorpyrifos	µg/L	0.012	--	0.025	--	--
Chlorodibromomethane	µg/L	--	--	2.2	--	--
Copper, Total Recoverable	µg/L	7.3	--	9.3	--	--
Cyanide	µg/L	--	--	11	--	--
Dibenzo(ah)anthracene	µg/L	0.2	--	0.4	--	--
Dichlorobromomethane	µg/L	--	--	3.4	--	--
Methylene Chloride	µg/L	4.7	--	11	--	--
N-nitrosodimethylamine	µg/L	0.00069	--	0.0014	--	--
Pentachlorophenol	µg/L	--	--	18	--	--
Tetrachloroethylene	µg/L	--	--	4.4	--	--
1,2-Diphenyl-hydrazine	µg/L	0.04	--	0.08	--	--
Non-Conventional Pollutants						
Settleable Solids	ml/L	0.1	--	0.2	--	--
Aluminum, Total Recoverable	µg/L	503	--	750	--	--
Ammonia Nitrogen, Total (as N)	mg/L	1.8	--	2.2	--	--
	lbs/day <sup>1</sup>	2720	--	3320	--	--
Nitrate, Total (as N)	mg/L	0.26	--	--	--	--
Manganese, Total Recoverable	µg/L	--	--	85	--	--
Methyl Tertiary Butyl Ether	µg/L	--	--	18	--	--

<sup>1</sup> Based on a design average dry weather flow of 181 MGD.

- b. Percent Removal.** The average monthly percent removal of 5-day biochemical oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) shall not be less than 85 percent.
- c. Chronic Whole Effluent Toxicity.** There shall be no chronic whole effluent toxicity in the effluent discharge.
- d. Acute Whole Effluent Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
  - i. 70%, minimum for any one bioassay; and
  - ii. 90%, median for any three consecutive bioassays.
- e. Temperature.** The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.
- f. Total Residual Chlorine.** Effluent total residual chlorine shall not exceed:
  - i. 0.011 mg/L, as a 4-day average; and
  - ii. 0.019 mg/L, as a 1-hour average.
- g. Total Coliform Organisms.** Effluent total coliform organisms shall not exceed:
  - i. 2.2 most probable number (MPN) per 100 mL, as a 7-day median;
  - ii. 23 MPN/100 mL, more than once in any 30-day period; and
  - iii. 240 MPN/100 mL, at any time.
- h. Average Dry Weather Flow.** The average dry weather discharge flow shall not exceed 181 mgd.
- i. Aluminum, Total Recoverable.** Effluent total recoverable aluminum concentrations shall not exceed 200 µg/L as a calendar annual average.
- j. Electrical Conductivity.** Effluent electrical conductivity shall not exceed 840 µmhos/cm as a calendar annual average.
- k. Mercury.** For a calendar year, the annual mass load of total mercury shall not exceed 2.2 lbs/year.

## 2. Interim Effluent Limitations – Discharge Point No. 001

The Discharger shall maintain compliance with the following interim effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location EFF-001 as described in the Monitoring and Reporting Program.

- a. Effective immediately and ending on 30 November 2020,** the Discharger shall maintain compliance with the interim effluent limitations specified in Table 7.

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These interim effluent limitations shall apply in lieu of the corresponding final effluent limitations specified for the same parameters during the time period indicated in this provision:

**Table 7. Interim Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	30	45	60	--	--
	lbs/day <sup>1</sup>	45,286	67,929	90,572	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
	lbs/day <sup>1</sup>	45,286	67,929	90,572	--	--
Non-Conventional Pollutants						
Ammonia Nitrogen, Total (as N)	mg/L	--	--	45	--	--
	lbs/day <sup>1</sup>	--	--	67,929	--	--
Total Coliform Organisms	MPN/100 mL	--	23 <sup>2</sup>	500 <sup>3</sup>	--	
Total Residual Chlorine	mg/L	0.011	--	0.018 <sup>4</sup>	--	--
Chlorpyrifos	µg/L	--	--	0.12	--	--

1. Based on a design flow of 181 MGD.

2. Weekly median

3. Shall not be exceeded in any two (2) consecutive days

4. Daily average effluent limitation

## B. Land Discharge Specifications – Not Applicable

## C. Reclamation Specifications – Not Applicable

## V. RECEIVING WATER LIMITATIONS

### A. Surface Water Limitations

Receiving water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The discharge shall not cause the following in the Sacramento River and Sacramento-San Joaquin Delta:

1. **Bacteria.** The fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, to exceed a geometric mean of 200 MPN/100 mL, nor more than 10 percent of the total number of fecal coliform samples taken during any 30-day period to exceed 400 MPN/100 mL.
2. **Biostimulatory Substances.** Water to contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses.
3. **Chemical Constituents.** Chemical constituents to be present in concentrations that adversely affect beneficial uses.
4. **Color.** Discoloration that causes nuisance or adversely affects beneficial uses.
5. **Dissolved Oxygen:**
  - a. The monthly median of the mean daily dissolved oxygen concentration to fall below 85 percent of saturation in the main water mass;
  - b. The 95 percentile dissolved oxygen concentration to fall below 75 percent of saturation; nor
  - c. The dissolved oxygen concentration to be reduced below 7.0 mg/L at any time.
6. **Floating Material.** Floating material to be present in amounts that cause nuisance or adversely affect beneficial uses.
7. **Oil and Grease.** Oils, greases, waxes, or other materials to be present in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.
8. **pH.** The pH to be depressed below 6.5 nor raised above 8.5.
9. **Pesticides:**
  - a. Pesticides to be present, individually or in combination, in concentrations that adversely affect beneficial uses;
  - b. Pesticides to be present in bottom sediments or aquatic life in concentrations that adversely affect beneficial uses;



- c. Total identifiable persistent chlorinated hydrocarbon pesticides to be present in the water column at concentrations detectable within the accuracy of analytical methods approved by USEPA or the Executive Officer
- d. Pesticide concentrations to exceed those allowable by applicable antidegradation policies (see State Water Board Resolution No. 68-16 and 40 CFR 131.12,
- e. Pesticide concentrations to exceed the lowest levels technically and economically achievable;
- f. Pesticides to be present in concentration in excess of the maximum contaminant levels <set forth in CCR, Title 22, division 4, chapter 15; nor
- g. Thiobencarb to be present in excess of 1.0 µg/L.

#### 10. Radioactivity:

- a. Radionuclides to be present in concentrations that are harmful to human, plant, animal, or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.
- b. Radionuclides to be present in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of section 64443 of Title 22 of the California Code of Regulations.

**11. Suspended Sediments.** The suspended sediment load and suspended sediment discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

**12. Settleable Substances.** Substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

**13. Suspended Material.** Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.

**14. Taste and Odors.** Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

#### 15. Temperature.

- a. If the natural receiving water temperature is less than 65°F, the discharge shall not create a zone, defined by water temperature of more than 2°F above natural temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.

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- b. If the natural receiving water temperature is 65°F or greater, the discharge shall not create a zone, defined by a water temperature of 1°F or more above natural receiving water temperature which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution for more than one hour per day as an average in any month.

**16. Toxicity.** Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

**17. Turbidity.**

- a. Shall not exceed 2 Nephelometric Turbidity Units (NTU) where natural turbidity is less than 1 NTU;
- b. Shall not increase more than 1 NTU where natural turbidity is between 1 and 5 NTUs;
- c. Shall not increase more than 20 percent where natural turbidity is between 5 and 50 NTUs;
- d. Shall not increase more than 10 NTU where natural turbidity is between 50 and 100 NTUs; no
- e. Shall not increase more than 10 percent where natural turbidity is greater than 100 NTUs.

**B. Groundwater Limitations.**

The release of waste constituents from any transport, storage, treatment, or disposal component associated with the Facility or collection system shall not cause the underlying groundwater to be degraded.

## VI. PROVISIONS

### A. Standard Provisions

1. The Discharger shall comply with all (federal NPDES standard conditions from 40 CFR Part 122) Standard Provisions included in Attachment D of this Order.
2. The Discharger shall comply with the following provisions:
  - a. If the Discharger's wastewater treatment plant is publicly owned or subject to regulation by California Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to Title 23, CCR, division 3, chapter 26.
  - b. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
    - i. Violation of any term or condition contained in this Order;
    - ii. Obtaining this Order by misrepresentation or by failing to disclose fully all relevant facts;
    - iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge; and
    - iv. A material change in the character, location, or volume of discharge.

The causes for modification include:

- *New regulations.* New regulations have been promulgated under section 405(d) of the CWA, or the standards or regulations on which the permit was based have been changed by promulgation of amended standards or regulations or by judicial decision after the permit was issued.
- *Land application plans.* When required by a permit condition to incorporate a land application plan for beneficial reuse of sewage sludge, to revise an existing land application plan, or to add a land application plan.
- *Change in sludge use or disposal practice.* Under 40 CFR 122.62(a)(1), a change in the Discharger's sludge use or disposal practice is a cause for modification of the permit. It is cause for revocation and reissuance if the Discharger requests or agrees.

The Central Valley Water Board may review and revise this Order at any time upon application of any affected person or the Central Valley Water Board's own motion.

- c. If a toxic effluent standard or prohibition (including any scheduled compliance specified in such effluent standard or prohibition) is established under section 307(a) of the CWA, or amendments thereto, for a toxic pollutant that is present in the discharge authorized herein, and such standard or prohibition is more stringent than any limitation upon such pollutant in this Order, the Central Valley Water Board will revise or modify this Order in accordance with such toxic effluent standard or prohibition.

The Discharger shall comply with effluent standards and prohibitions within the time provided in the regulations that establish those standards or prohibitions, even if this Order has not yet been modified.

- d. This Order shall be modified, or alternately revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:
- i. contains different conditions or is otherwise more stringent than any effluent limitation in the Order; or
  - ii. controls any pollutant limited in the Order.

The Order, as modified or reissued under this paragraph, shall also contain any other requirements of the CWA then applicable.

- e. The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of this Order shall not be affected.
- f. The Discharger shall take all reasonable steps to minimize any adverse effects to waters of the State or users of those waters resulting from any discharge or sludge use or disposal in violation of this Order. Reasonable steps shall include such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge or sludge use or disposal, and adequate public notification to downstream water agencies or others who might contact the non-complying discharge.
- g. The Discharger shall ensure compliance with any existing or future pretreatment standard promulgated by USEPA under section 307 of the CWA, or amendment thereto, for any discharge to the municipal system.
- h. The discharge of any radiological, chemical or biological warfare agent or high-level, radiological waste is prohibited.
- i. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel. Key operating personnel shall be familiar with its content.
- j. Safeguard to electric power failure:

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- i. The Discharger shall provide safeguards to assure that, should there be reduction, loss, or failure of electric power, the discharge shall comply with the terms and conditions of this Order.
- ii. Upon written request by the Central Valley Water Board the Discharger shall submit a written description of safeguards. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means. A description of the safeguards provided shall include an analysis of the frequency, duration, and impact of power failures experienced over the past 5 years on effluent quality and on the capability of the Discharger to comply with the terms and conditions of the Order. The adequacy of the safeguards is subject to the approval of the Central Valley Water Board.
- iii. Should the treatment works not include safeguards against reduction, loss, or failure of electric power, or should the Central Valley Water Board not approve the existing safeguards, the Discharger shall, within 90 days of having been advised in writing by the Central Valley Water Board that the existing safeguards are inadequate, provide to the Central Valley Water Board and USEPA a schedule of compliance for providing safeguards such that in the event of reduction, loss, or failure of electric power, the Discharger shall comply with the terms and conditions of this Order. The schedule of compliance shall, upon approval of the Central Valley Water Board, become a condition of this Order.
- k. The Discharger, upon written request of the Central Valley Water Board, shall file with the Board a technical report on its preventive (failsafe) and contingency (cleanup) plans for controlling accidental discharges, and for minimizing the effect of such events. This report may be combined with that required under Central Valley Water Board Standard Provision contained in section VI.A.2.i. of this Order.

The technical report shall:

- i. Identify the possible sources of spills, leaks, untreated waste by-pass, and contaminated drainage. Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.
- ii. Evaluate the effectiveness of present facilities and procedures and state when they became operational.
- iii. Predict the effectiveness of the proposed facilities and procedures and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

The Central Valley Water Board, after review of the technical report, may establish conditions which it deems necessary to control accidental

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discharges and to minimize the effects of such events. Such conditions shall be incorporated as part of this Order, upon notice to the Discharger.

- l.** A publicly owned treatment works whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment and disposal facilities. The projections shall be made in January, based on the last 3 years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in 4 years, the Discharger shall notify the Central Valley Water Board by 31 January. A copy of the notification shall be sent to appropriate local elected officials, local permitting agencies and the press. Within 120 days of the notification, the Discharger shall submit a technical report showing how it will prevent flow volumes from exceeding capacity or how it will increase capacity to handle the larger flows. The Central Valley Water Board may extend the time for submitting the report.
- m.** The Discharger shall submit technical reports as directed by the Executive Officer. All technical reports required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code, sections 6735, 7835, and 7835.1. To demonstrate compliance with Title 16, CCR, sections 415 and 3065, all technical reports must contain a statement of the qualifications of the responsible registered professional(s). As required by these laws, completed technical reports must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work.
- n.** The Central Valley Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387.
- o.** For publicly owned treatment works, prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Board, Division of Water Rights, and receive approval for such a change. (CWC section 1211).
- p.** In the event the Discharger does not comply or will be unable to comply for any reason, with any prohibition, maximum daily effluent limitation, 1-hour average effluent limitation, or receiving water limitation contained in this Order, the Discharger shall notify the Central Valley Water Board by telephone (916) 464-3291 within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within 5 days, unless the Central Valley Water Board waives confirmation. The written notification shall include the information required by the Standard Provision contained in Attachment D section V.E.1. [40 CFR 122.41(l)(6)(i)].

- q. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.
- r. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, address and telephone number of the persons responsible for contact with the Central Valley Water Board and a statement. The statement shall comply with the signatory and certification requirements in the federal Standard Provisions (Attachment D, section V.B) and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the CWC. Transfer shall be approved or disapproved in writing by the Executive Officer.

## **B. Monitoring and Reporting Program Requirements**

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order.

## **C. Special Provisions**

### **1. Reopener Provisions**

- a. Conditions that necessitate a major modification of a permit are described in 40 CFR 122.62, including:
  - i. If new or amended applicable water quality standards are promulgated or approved pursuant to section 303 of the CWA, or amendments thereto, this permit may be reopened and modified in accordance with the new or amended standards.
  - ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.
- b. This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements

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on internal waste streams, and monitoring for surrogate parameters. Additional requirements may be included in this Order as a result of the special condition monitoring data.

- c. **Pollution Prevention.** This Order requires the Discharger prepare pollution prevention plans following CWC section 13263.3(d)(3) for salinity. Based on a review of the pollution prevention plans, this Order may be reopened for addition and/or modification of effluent limitations and requirements for these constituents.
- d. **Whole Effluent Toxicity.** As a result of a Toxicity Reduction Evaluation (TRE), this Order may be reopened to include a chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if the State Water Board revises the SIP's toxicity control provisions that would require the establishment of numeric chronic toxicity effluent limitations, this Order may be reopened to include a numeric chronic toxicity effluent limitation based on the new provisions.
- e. **Water Effects Ratios (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating CTR criteria for applicable priority pollutant inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.
- f. **Perchlorate Study.** If after review of the study results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective this Order may be reopened and effluent limitations added for the subject constituents.
- g. **Central Valley Drinking Water Policy.** If water quality objectives are adopted for organic carbon, nutrients, salinity, bromide, or pathogens to protect drinking water supplies in the Central Valley Region, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate, to require compliance with the applicable water quality objectives.
- h. **Ammonia Studies.** The ammonia effluent limitations in this Order are based on USEPA's recommended National Ambient Water Quality Criteria for protection of freshwater aquatic life. However, studies are ongoing to evaluate the effect of ammonia on the inhibition of growth of freshwater diatoms in the Delta, as well as, studies to evaluate the sensitivity of delta smelt to ammonia toxicity. Based on the result of these or other studies, this Order may be reopened to modify the ammonia effluent limitations, as appropriate.
- i. **Temperature Studies.** The temperature effluent limitations and receiving water prohibitions are based on the existing Thermal Plan exemption conditions. The United States Fish and Wildlife Service (USFWS) requested studies to

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characterize fish behavior in the affected river reach to determine how fish behave in response to the discharge field, and whether predator concentrations are elevated in the thermal discharge field. Based on the result of these studies, this Order may be reopened to modify the temperature effluent limitations and receiving water prohibitions, as appropriate.

- j. **Regional Monitoring Program.** The State and Regional Water Boards are committed to creation of a coordinated Regional Monitoring Program to address receiving water monitoring in the Delta for all Water Board regulatory and research programs. When a Regional Monitoring Program becomes functional, this permit may be reopened to make appropriate adjustments in permit-specific monitoring to coordinate with the Regional Monitoring Program.
- k. **The Bay-Delta Plan.** The South Delta salinity standards are currently under review by the State Water Board in accordance with implementation provisions contained in the Bay-Delta Water Quality Control Plan. If applicable water quality objectives of the Bay-Delta Plan are adopted, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate.

## 2. Special Studies, Technical Reports and Additional Monitoring Requirements

- a. **Chronic Whole Effluent Toxicity.** For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct chronic whole effluent toxicity (WET) testing, as specified in the Monitoring and Reporting Program (Attachment E, section V). Furthermore, this Provision requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exhibits toxicity exceeding the numeric toxicity monitoring trigger during accelerated monitoring established in this Provision, the Discharger is required to initiate a TRE in accordance with an approved TRE Workplan, and take actions to mitigate the impact of the discharge and prevent recurrence of toxicity. A TRE is a site-specific study conducted in a stepwise process to identify the source(s) of toxicity and the effective control measures for effluent toxicity. TREs are designed to identify the causative agents and sources of effluent toxicity, evaluate the effectiveness of the toxicity control options, and confirm the reduction in effluent toxicity. This Provision includes requirements for the Discharger to develop and submit a TRE Workplan and includes procedures for accelerated chronic toxicity monitoring and TRE initiation.
- i. **Toxicity Reduction Evaluation (TRE) Workplan.** Within 90 days of the effective date of this Order, the Discharger shall submit to the Central Valley Water Board a TRE Workplan for approval by the Executive Officer. The TRE Workplan shall outline the procedures for identifying the source(s) of, and reducing or eliminating effluent toxicity. The TRE Workplan must be

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<sup>1</sup> and be of adequate detail to allow the Discharger to immediately initiate a TRE as required in this Provision.

- ii. **Accelerated Monitoring and TRE Initiation.** When the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall initiate accelerated monitoring as required in the Accelerated Monitoring Specifications. The Discharger shall initiate a TRE to address effluent toxicity if any WET testing results exceed the numeric toxicity monitoring trigger during accelerated monitoring.
- iii. **Numeric Toxicity Monitoring Trigger.** The numeric toxicity monitoring trigger to initiate a TRE is 6 TU<sub>C</sub> (where TU<sub>C</sub> = 100/NOEC). The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE when the effluent exhibits toxicity.
- iv. **Accelerated Monitoring Specifications.** If the numeric toxicity monitoring trigger is exceeded during regular chronic toxicity testing, the Discharger shall initiate accelerated monitoring within 14 days of notification by the laboratory of the exceedance. Accelerated monitoring shall consist of four (4) chronic toxicity tests conducted once every 2 weeks using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:
  - (a) If the results of four (4) consecutive accelerated monitoring tests do not exceed the monitoring trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.
  - (b) If the source(s) of the toxicity is easily identified (e.g., temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until four (4) consecutive accelerated tests do not exceed the monitoring trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.
  - (c) If the result of any accelerated toxicity test exceeds the monitoring trigger, the Discharger shall cease accelerated monitoring and begin a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of any test result exceeding the monitoring trigger during

<sup>1</sup> See the Fact Sheet (Attachment F, section VII.B.2.a. for a list of USEPA guidance documents that must be considered in the development of the TRE Workplan.)

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accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Central Valley Water Board including, at minimum:

- (1) Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including a TRE WET monitoring schedule;
- (2) Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and
- (3) A schedule for these actions.

- b. Perchlorate Study.** There are indications that the discharge may contain perchlorate at levels that may have a reasonable potential to cause or contribute to an exceedance of water quality objectives. The Discharger shall comply with the following time schedule to conduct a study of to determine if the effluent has the reasonable potential to cause or contribute to an instream exceedance of the applicable water quality objective for perchlorate:

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from adoption of Permit
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task i.

- c. Ammonia and Nitrogen Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval for conducting studies of existing and threatened impacts of ammonia and nitrogen on aquatic ecosystems in the Sacramento River, Delta, Suisun Bay and other potentially impacted waterbodies within 90 days from adoption of this Order. Studies should be conducted in coordination and conjunction with similar studies that may be required of other NPDES dischargers of ammonia containing ammonia and/or nitrogen into the waterways of concern. Proposed studies shall build upon existing research and be directed at clarifying and quantifying aquatic ecology impact issues as directed by the Executive Officer. The workplan shall be implemented upon approval by the Executive Officer.

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from adoption of Permit
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task i.

- d. *Hyaella azteca* Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval to conduct a study to develop procedures for conducting whole effluent toxicity (WET) testing using *Hyaella azteca* as the test species. The procedures shall result in WET testing that will provide an evaluation of both the acute and chronic toxicity of the discharge. The study should develop procedures that build upon existing research of WET testing using *Hyaella azteca* and shall recommend monitoring frequencies that result in an effective evaluation of the discharge (e.g., monitoring conducted when pyrethroid pesticides may be prevalent in the discharge). The workplan shall be implemented upon approval by the Executive Officer.

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from adoption of Permit
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task i.
v. Full Implementation of WET testing using <i>Hyaella azteca</i>	To be determined in Study Report

- e. Temperature Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval for determining whether permitted conditions are protective of delta smelt and the Sacramento biota and will increase the level of certainty regarding the determination. The workplan will shall be implemented upon approval by the Executive Officer. The study will include the following:

- i. Continuous monitoring of the thermal discharge in coordination with mixing zone monitoring during December – June.
- ii. An evaluation using hydroacoustic technology to determine if there are aggregations of large fish or schools of small fish in the zone of elevated water temperature that are atypical compared to other nearby mid-channel river reaches.
- iii. District initiated ambient water acute toxicity testing using rainbow trout, bi-weekly during December – June for two years. The tests should employ a control using water from upstream of Freeport Bridge and using ambient river water either in situ or at the temperature it was collected, from about 65 feet downstream of the diffuser.
- iv. District initiated ambient water chronic toxicity testing using reainbow trout, bi-weekly during December - June for two years. The tests should employ a control using water from upstream of Freeport Bridge and using ambient river water either in situ or at the temperature it was collected, from about 360 feet downstream of the diffuser.

<u>Task</u>	<u>Compliance Date</u>
i. Submit Workplan and Time Schedule	90 days from adoption of Permit
ii. Begin Study	To be determined in Task i.
iii. Complete Study	To be determined in Task i.
iv. Submit Study Report	To be determined in Task i.

### 3. Best Management Practices and Pollution Prevention

- a. **Pollution Prevention Plan for mercury.** The Discharger shall prepare and implement a pollution prevention plan for mercury, in accordance with CWC section 13263.3(d)(3). The minimum requirements for the pollution prevention plan are outlined in the Fact Sheet (Attachment F section VI.C.7.b). The pollution prevention plan shall be completed and submitted to the Central Valley Water Board within nine months. Progress reports shall be submitted in accordance with the Monitoring and Reporting Program (Attachment E section X.D.1.)
- b. **Salinity Evaluation and Minimization Plan.** The Discharger shall prepare a salinity evaluation and minimization plan to address sources of salinity from the Facility. The plan shall be completed and submitted to the Central Valley Water Board **within 9 months of the adoption date of this Order** for the approval by the Executive Officer. The plan shall be implemented upon approval by the Executive Officer.
- c. **2,3,7,8-TCDD and Other Dioxin and Furan Congeners Source Evaluation and Minimization Plan.** The Discharger shall prepare a 2,3,7,8-TCDD and other dioxin and furan congeners evaluation and minimization plan to address sources of detectable dioxins OCDD and 1,2,3,6,7,8-HpCDD from the Facility. The plan shall be completed and submitted to the Central Valley Water Board within **nine** months of the adoption date of this Order for review and approval by the Executive Officer.

### 4. Construction, Operation and Maintenance Specifications

- a. **Turbidity.** Effective upon compliance with Special Provisions VI.C.6.a, effluent turbidity shall not exceed:
  - i. 2 NTU, as a daily average;
  - ii. 5 NTU, more than 5% of the time within a 24-hour period; and
  - iii. 10 NTU, at any time.

- b. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

**c. Emergency Storage Basin Operating Requirements.**

- i. The treatment facilities shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
- ii. Public contact with wastewater shall be precluded through such means as fences, signs, and other acceptable alternatives.
- iii. Ponds shall be managed to prevent breeding of mosquitoes. In particular,
- (a) An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
- (b) Weeds shall be minimized.
- (c) Dead algae, vegetation, and debris shall not accumulate on the water surface.
- iv. Freeboard shall never be less than 2 feet (measured vertically to the lowest point of overflow).
- v. The discharge of waste classified as "hazardous" as defined in section 2521(a) of Title 23, California Code of Regulations (CCR), or "designated", as defined in section 13173 of the CWC, to the treatment ponds is prohibited.
- vi. Objectionable odors originating at this Facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas (or property owned by the Discharger).
- vii. The dissolved oxygen content in the upper zone (1 foot) of wastewater in ponds shall not be less than 1.0 mg/L.
- viii. Ponds shall not have a pH less than 6.5 or greater than 8.5.

**5. Special Provisions for Municipal Facilities (POTWs Only)**

- a. **Collection System.** On 2 May 2006, the State Water Board adopted State Water Board Order No. 2006-0003, a Statewide General WDR for Sanitary Sewer Systems. The Discharger shall be subject to the requirements of Order No. 2006-0003 and any future revisions thereto. Order No. 2006-0003 requires

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that all public agencies that currently own or operate sanitary sewer systems apply for coverage under the General WDR. The Discharger has applied for and has been approved for coverage under State Water Board Order 2006-0003 for operation of its wastewater collection system.

Regardless of the coverage obtained under Order No. 2006-0003, the Discharger's collection system is part of the treatment system that is subject to this Order. As such, pursuant to federal regulations, the Discharger must properly operate and maintain its collection system [40 CFR 122.41(e)], report any non-compliance [40 CFR 122.41(l)(6) and (7)], and mitigate any discharge from the collection system in violation of this Order [40 CFR 122.41(d)].

**b. Pretreatment Requirements.**

- i. The Discharger shall be responsible and liable for the performance of all Control Authority pretreatment requirements contained in 40 CFR Part 403, including any subsequent regulatory revisions to 40 CFR Part 403. Where 40 CFR Part 403 or subsequent revision places mandatory actions upon the Discharger as Control Authority but does not specify a timetable for completion of the actions, the Discharger shall complete the required actions within 6 months from the issuance date of this permit or the effective date of the 40 CFR Part 403 revisions, whichever comes later. For violations of pretreatment requirements, the Discharger shall be subject to enforcement actions, penalties, fines, and other remedies by USEPA or other appropriate parties, as provided in the CWA.
- ii. The Discharger shall enforce the requirements promulgated under sections 307(b), 307(c), and 307(d), and 402(b) of the CWA with timely, appropriate and effective enforcement actions. The Discharger shall cause all nondomestic users subject to federal categorical standards to achieve compliance no later than the date specified in those requirements or, in the case of a new nondomestic user, upon commencement of the discharge.
- iii. The Discharger shall perform the pretreatment functions as required by in 40 CFR Part 403 including, but not limited to:
  - (a) Implement the necessary legal authorities required as provided in 40 CFR 403.8(f)(1);
  - (b) Enforce the pretreatment requirements under 40 CFR 403.5 and 403.6;
  - (c) Implement the programmatic functions as provided in 40 CFR 403.8(f)(2); and
  - (d) Provide the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3).
- iv. The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the necessary legal authorities, programs, and controls to

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ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:

- (a)** Wastes which create a fire or explosion hazard in the treatment works;
  - (b)** Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;
  - (c)** Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;
  - (d)** Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;
  - (e)** Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40°C (104°F), unless the Regional Water Board approves alternate temperature limits;
  - (f)** Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;
  - (g)** Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and:
  - (h)** Any trucked or hauled pollutants, except at points predesignated by the Discharger.
- v.** The Discharger shall implement, as more completely set forth in 40 CFR 403.5, the legal authorities, programs, and controls necessary to ensure that indirect discharges do not introduce pollutants into the sewerage system that, either alone or in conjunction with a discharge or discharges from other sources:
- (a)** Flow through the system to the receiving water in quantities or concentrations that cause a violation of this Order, or:
  - (b)** Inhibit or disrupt treatment processes, treatment system operations, or sludge processes, use, or disposal and either cause a violation of this Order or prevent sludge use or disposal in accordance with this Order.



## 6. Other Special Provisions

- a. **Effective 1 December 2020**, wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the Department of Public Health (DPH) reclamation criteria, CCR, Title 22, division 4, chapter 3, (Title 22), or equivalent, in accordance with the compliance schedule in Section VI.C.7.a, below.

## 7. Compliance Schedules

- a. **Title 22, or Equivalent, Disinfection Requirements.** By **1 December 2020**, wastewater discharged to the Sacramento River shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the Department of Public Health (DPH) reclamation criteria, Title 22 CCR, Division 4, Chapter 3, (Title 22), or equivalent. This Order also requires compliance with the final effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS by **1 December 2020**. Until final compliance, the Discharger shall submit progress reports in accordance with the Monitoring and Reporting Program (Attachment E, section X.D.1).

<u>Task</u>	<u>Date Due</u>
i. Submit Method of Compliance Workplan/Schedule	Within 6 months after adoption of this Order
iii. Progress Reports <sup>1</sup>	<b>1 February</b> , annually, after approval of work plan until final compliance
iv. Full Compliance	<b>1 December 2020</b>

<sup>1</sup> The progress reports shall detail what steps have been implemented towards achieving compliance with waste discharge requirements, including studies, construction progress, evaluation of measures implemented, and recommendations for additional measures as necessary to achieve full compliance by the final compliance date.

- b. Compliance Schedules for Final Effluent Limitations for ammonia and chlorpyrifos.** This Order requires compliance with the final effluent limitations for ammonia and chlorpyrifos by **1 December 2020**. The Discharger shall comply with the following time schedule to ensure compliance with the final effluent limitations:

<u>Task</u>	<u>Date Due</u>
i. Submit Method of Compliance Workplan/Schedule	Within 6 months after adoption of this Order
ii. Submit and Implement Pollution Prevention Plan (PPP) <sup>1</sup> for ammonia and chlorpyrifos	Within 1 year after adoption of this Order
iii. Progress Reports <sup>2</sup>	1 <b>June</b> , annually, after approval of work plan until final compliance
iv. Full Compliance	<b>1 December 2020</b>
<sup>1</sup> The PPP shall be prepared and implemented in accordance with CWC section <b>13263.3(d)(3)</b> , as outlined in the Fact Sheet (Attachment F section VI.C.7.b)	
<sup>2</sup> The progress reports shall detail what steps have been implemented towards achieving compliance with waste discharge requirements, including studies, construction progress, evaluation of measures implemented, and recommendations for additional measures as necessary to achieve full compliance by the final compliance date.	

## VII. COMPLIANCE DETERMINATION

- A. BOD<sub>5</sub> and TSS Effluent Limitations (Section IV.A.1).** Compliance with the final effluent limitations for BOD<sub>5</sub> and TSS required in Limitations and Discharge Requirements section IV.A.1.a shall be ascertained by 24-hour composite samples. Compliance with effluent limitations required in Limitations and Discharge Requirements section IV.A.1.b for percent removal shall be calculated using the arithmetic mean of BOD<sub>5</sub> and TSS in effluent samples collected over a monthly period as a percentage of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.
- B. Aluminum Effluent Limitations (Section IV.A.1.i).** Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry) analysis methods, as supported by USEPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.
- C. Total Mercury Mass Loading Effluent Limitations (Section IV.A.1.k).** The procedures for calculating mass loadings are as follows:
1. The total pollutant mass load for each individual calendar month shall be determined using an average of all concentration data collected that month and the

corresponding total monthly flow. All effluent monitoring data collected under the monitoring and reporting program, pretreatment program and any special studies shall be used for these calculations. The total annual mass loading shall be the sum of the individual calendar months.

2. In calculating compliance, the Discharger shall count all non-detect measures at one-half of the detection level. If compliance with the effluent limitation is not attained due to the non-detect contribution, the Discharger shall improve and implement available analytical capabilities and compliance shall be evaluated with consideration of the detection limits.

**D. Average Dry Weather Flow Effluent Limitations (Section IV.A.1.h).** The average dry weather discharge flow represents the daily average flow when groundwater is at or near normal and runoff is not occurring. Compliance with the average dry weather flow effluent limitations will be determined annually based on the average daily flow over three consecutive dry weather months (e.g., July, August, and September).

**E. Total Coliform Organisms Effluent Limitations (Section IV.A.1.g).** For each day that an effluent sample is collected and analyzed for total coliform organisms, the 7-day median shall be determined by calculating the median concentration of total coliform bacteria in the effluent utilizing the bacteriological results of the last 7 days. For example, if a sample is collected on a Wednesday, the result from that sampling event and all results from the previous 6 days (i.e., Tuesday, Monday, Sunday, Saturday, Friday, and Thursday) are used to calculate the 7-day median. If the 7-day median of total coliform organisms exceeds a most probable number (MPN) of 23 per 100 milliliters, the Discharger will be considered out of compliance.

**F. Total Residual Chlorine Effluent Limitations (Section IV.A.1.<x>).** Continuous monitoring analyzers for chlorine residual or for dechlorination agent residual in the effluent are appropriate methods for compliance determination. A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which demonstrates compliance with the effluent limitations. This type of monitoring can also be used to prove that some chlorine residual exceedances are false positives. Continuous monitoring data showing either a positive dechlorination agent residual or a chlorine residual at or below the prescribed limit are sufficient to show compliance with the total residual chlorine effluent limitations, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

Any excursion above the 1-hour average or 4-day average total residual chlorine effluent limitations is a violation. If the Discharger conducts continuous monitoring and the Discharger can demonstrate, through data collected from a back-up monitoring system, that a chlorine spike recorded by the continuous monitor was not actually due to chlorine, then any excursion resulting from the recorded spike will not be considered an exceedance, but rather reported as a false positive. Records supporting validation of false positives shall be maintained in accordance with Section IV Standard Provisions (Attachment D).

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**G. Chronic Whole Effluent Toxicity Effluent Limitation (Section IV.A.1.<x>).**

Compliance with the accelerated monitoring and TRE/TIE provisions of Provision VI.C.2.a shall constitute compliance with the effluent limitation.

**H. Mass Effluent Limitations (Section IV.A.1.a).** The mass effluent limitations contained in Final Effluent Limitations IV.A.1.a and Interim Effluent Limitations IV.A.2.a and d are based on the permitted average dry weather flow and calculated as follows:

Mass (lbs/day) = Flow (MGD) x Concentration (mg/L) x 8.34 (conversion factor)

If the effluent flow exceeds the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations contained in Final Effluent Limitations IV.A.1.a and Interim Effluent Limitations IV.A.2.a and d shall not apply. If the effluent flow is below the permitted average dry weather flow during wet-weather seasons, the effluent mass limitations do apply.

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## ATTACHMENT A – DEFINITIONS

### Arithmetic Mean ( $\mu$ )

Also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean =  $\mu = \Sigma x / n$       where:  $\Sigma x$  is the sum of the measured ambient water concentrations, and  $n$  is the number of samples.

### Average Monthly Effluent Limitation (AMEL)

The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

### Average Weekly Effluent Limitation (AWEL)

The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

### Bioaccumulative

Those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

### Carcinogenic

Pollutants are substances that are known to cause cancer in living organisms.

### Coefficient of Variation (CV)

CV is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

### Daily Discharge

Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of 1 day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

### **Diatoms**

Diatoms are planktonic micro algae.

### **Detected, but Not Quantified (DNQ)**

DNQ are those sample results less than the RL, but greater than or equal to the laboratory's MDL.

### **Dilution Credit**

Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

### **Effluent Concentration Allowance (ECA)**

ECA is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

### **Enclosed Bays**

Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

### **Estimated Chemical Concentration**

The estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

### **Estuaries**

Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters included, but are not limited to, the Sacramento-San Joaquin Delta, as defined in CWC section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

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## **Inland Surface Waters**

All surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

### **Instantaneous Maximum Effluent Limitation**

The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

### **Instantaneous Minimum Effluent Limitation**

The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

### **Larval Fish**

Larval Fish are early life stage in the life of fish.

### **LC<sub>50</sub>**

LC<sub>50</sub> is the concentration of effluent that is lethal to 50% of the exposed test organisms (measured in a dilution series ranging from 100% effluent to 0% effluent).

### **LOEC**

LOEC is the Lowest Observed Effect Concentration (the Lowest concentration of an effluent at which adverse effects are observed on the aquatic test organism).

### **Maximum Daily Effluent Limitation (MDEL)**

The highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

### **Median**

The middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements ( $n$ ) is odd, then the median =  $X_{(n+1)/2}$ . If  $n$  is even, then the median =  $(X_{n/2} + X_{(n/2)+1})/2$  (i.e., the midpoint between the  $n/2$  and  $n/2+1$ ).

### **Method Detection Limit (MDL)**

MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 CFR Part 136, Attachment B, revised as of 3 July 1999.

### **Minimum Level (ML)**

ML is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

### **Mixing Zone**

Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

### **NOEC**

NOEC is the No Observed Effect Concentration (the highest concentration of an effluent at which no adverse effects are observed on the aquatic test organism).

### **Not Detected (ND)**

Sample results which are less than the laboratory's MDL.

### **Ocean Waters**

The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

### **Pelagic Zone**

Pelagic Zone is a zone of the ocean with plants or animals living or growing at or near the surface of the ocean. Pelagic organisms may be found in the brackish water (water that is a combination of salt and fresh water) of deltas and estuaries.

### **Persistent Pollutants**

Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

### **Primary Production**

Primary production is the production of organic compounds from atmospheric or aquatic carbon dioxide, principally through the process of photosynthesis. The organisms responsible for primary production are known as primary producers and form the base of the food chain. In aquatic systems, algae are primary producers.

### **Pollutant Minimization Program (PMP)**

PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Central Valley Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to CWC section 13263.3(d), shall be considered to fulfill the PMP requirements.

### **Pollution Prevention**

Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not



limited to, input change, operational improvement, production process change, and product reformulation (as defined in Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State or Central Valley Water Board.

### **Reporting Level (RL)**

RL is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Central Valley Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

### **Satellite Collection System**

The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

### **Source of Drinking Water**

Any water designated as municipal or domestic supply (MUN) in a Central Valley Water Board Basin Plan.

### **Standard Deviation ( $\sigma$ )**

Standard Deviation is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

where:

$x$  is the observed value;

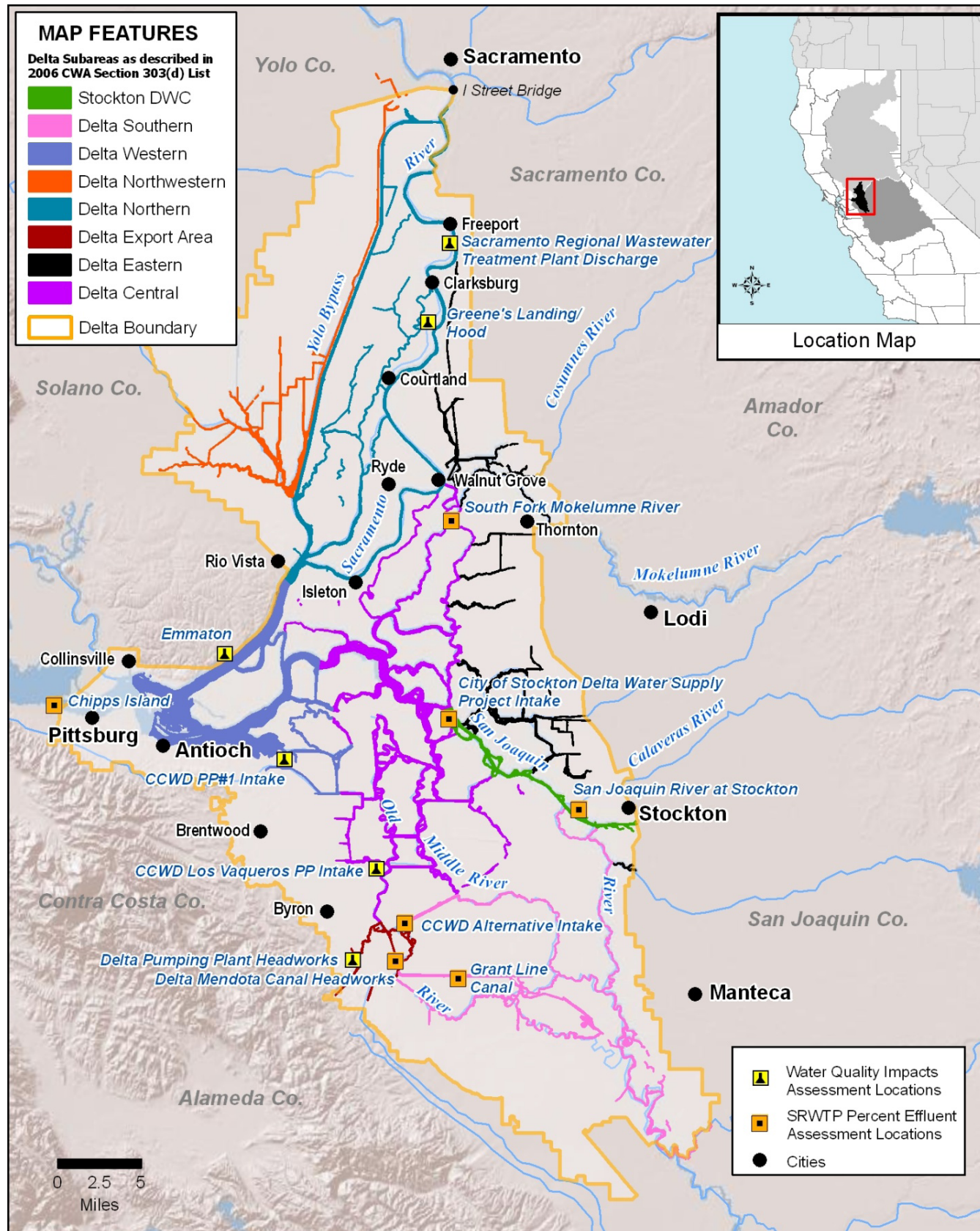
$\mu$  is the arithmetic mean of the observed values; and

$n$  is the number of samples.

### **Toxicity Reduction Evaluation (TRE)**

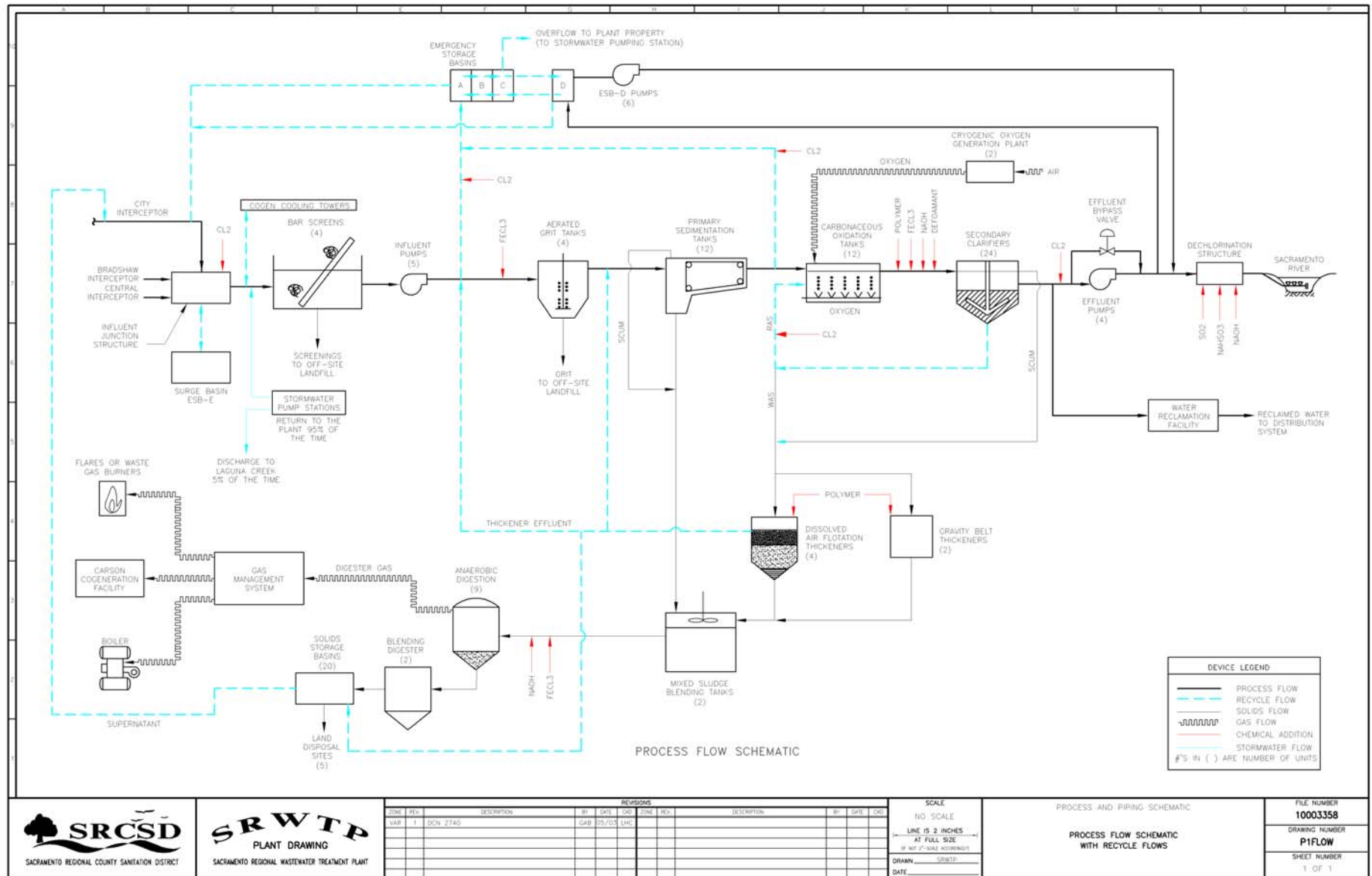
TRE is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

## ATTACHMENT B – MAP



Attachment B - Map

ATTACHMENT C – FLOW SCHEMATIC



## **ATTACHMENT D – STANDARD PROVISIONS**

### **STANDARD PROVISIONS – PERMIT COMPLIANCE**

#### **Duty to Comply**

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code (CWC) and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR 122.41(a).)
2. The Discharger shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR 122.41(a)(1).)

#### **Need to Halt or Reduce Activity Not a Defense**

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 CFR 122.41(c).)

#### **Duty to Mitigate**

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 CFR 122.41(d).)

#### **Proper Operation and Maintenance**

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order. (40 CFR 122.41(e).)

#### **Property Rights**

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR 122.5(c).)

### **Inspection and Entry**

The Discharger shall allow the Central Valley Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR 122.41(i); CWC section 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR 122.41(i)(1));
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR 122.41(i)(2));
3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR 122.41(i)(3)); and
4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the CWC, any substances or parameters at any location. (40 CFR 122.41(i)(4).)

### **Bypass**

1. Definitions
  - a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR 122.41(m)(1)(i).)
  - b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR 122.41(m)(1)(ii).)
2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR 122.41(m)(2).)

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3. Prohibition of bypass. Bypass is prohibited, and the Central Valley Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR 122.41(m)(4)(i)):
  - a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR 122.41(m)(4)(i)(A));
  - b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR 122.41(m)(4)(i)(B)); and
  - c. The Discharger submitted notice to the Central Valley Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR 122.41(m)(4)(i)(C).)
4. The Central Valley Water Board may approve an anticipated bypass, after considering its adverse effects, if the Central Valley Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR 122.41(m)(4)(ii).)
5. Notice
  - a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 CFR 122.41(m)(3)(i).)
  - b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR 122.41(m)(3)(ii).)

## Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 CFR 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that

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- noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 CFR 122.41(n)(2).)
2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR 122.41(n)(3)):
    - a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR 122.41(n)(3)(i));
    - b. The permitted facility was, at the time, being properly operated (40 CFR 122.41(n)(3)(ii));
    - c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR 122.41(n)(3)(iii)); and
    - d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 CFR 122.41(n)(3)(iv).)
  3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR 122.41(n)(4).)

## **STANDARD PROVISIONS – PERMIT ACTION**

### **General**

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 CFR 122.41(f).)

### **Duty to Reapply**

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 CFR 122.41(b).)

### **Transfers**

This Order is not transferable to any person except after notice to the Central Valley Water Board. The Central Valley Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the CWC. (40 CFR 122.41(l)(3) and 122.61.)

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## **STANDARD PROVISIONS – MONITORING**

- A.** Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR 122.41(j)(1).)
- B.** Monitoring results must be conducted according to test procedures under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503 unless other test procedures have been specified in this Order. (40 CFR 122.41(j)(4) and 122.44(i)(1)(iv).)

## **STANDARD PROVISIONS – RECORDS**

- A.** Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least 5 years (or longer as required by 40 CFR Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Central Valley Water Board Executive Officer at any time. (40 CFR 122.41(j)(2).)

### **B. Records of monitoring information shall include:**

- 1. The date, exact place, and time of sampling or measurements (40 CFR 122.41(j)(3)(i));
- 2. The individual(s) who performed the sampling or measurements (40 CFR 122.41(j)(3)(ii));
- 3. The date(s) analyses were performed (40 CFR 122.41(j)(3)(iii));
- 4. The individual(s) who performed the analyses (40 CFR 122.41(j)(3)(iv));
- 5. The analytical techniques or methods used (40 CFR 122.41(j)(3)(v)); and
- 6. The results of such analyses. (40 CFR 122.41(j)(3)(vi).)

### **C. Claims of confidentiality for the following information will be denied (40 CFR 122.7(b)):**

- 1. The name and address of any permit applicant or Discharger (40 CFR 122.7(b)(1)); and
- 2. Permit applications and attachments, permits and effluent data. (40 CFR 122.7(b)(2).)



## STANDARD PROVISIONS – REPORTING

### A. Duty to Provide Information

The Discharger shall furnish to the Central Valley Water Board, State Water Board, or USEPA within a reasonable time, any information which the Central Valley Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Central Valley Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 CFR 122.41(h); Wat. Code, § 13267.)

### B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Central Valley Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR 122.41(k).)
2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR 122.22(a)(3).)
3. All reports required by this Order and other information requested by the Central Valley Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR 122.22(b)(1));
  - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR 122.22(b)(2)); and
  - c. The written authorization is submitted to the Central Valley Water Board and State Water Board. (40 CFR 122.22(b)(3).)
4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard

Provisions – Reporting V.B.3 above must be submitted to the Central Valley Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

*“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”* (40 CFR 122.22(d).)

### C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR 122.22(l)(4).)
2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Central Valley Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 CFR 122.41(l)(4)(i).)
3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Central Valley Water Board. (40 CFR 122.41(l)(4)(ii).)
4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR 122.41(l)(4)(iii).)

### D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 CFR 122.41(l)(5).)

### E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time

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the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR 122.41(l)(6)(ii)):
  - a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(A).)
  - b. Any upset that exceeds any effluent limitation in this Order. (40 CFR 122.41(l)(6)(ii)(B).)
3. The Central Valley Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR 122.41(l)(6)(iii).)

#### **F. Planned Changes**

The Discharger shall give notice to the Central Valley Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b) (40 CFR 122.41(l)(1)(i)); or
2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 CFR 122.41(l)(1)(ii).)
3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR 122.41(l)(1)(iii).)

#### **G. Anticipated Noncompliance**

The Discharger shall give advance notice to the Central Valley Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 CFR 122.41(l)(2).)

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## H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 CFR 122.41(l)(7).)

## I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Central Valley Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 CFR 122.41(l)(8).)

## VI. STANDARD PROVISIONS – ENFORCEMENT

- A. The Central Valley Water Board is authorized to enforce the terms of this permit under several provisions of the CWC, including, but not limited to, sections 13385, 13386, and 13387

## VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

### A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Central Valley Water Board of the following (40 CFR 122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR 122.42(b)(1)); and
2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR 122.42(b)(2).)
3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 CFR 122.42(b)(3).)

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## ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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## ATTACHMENT E – MONITORING AND REPORTING PROGRAM

Title 40 of the Code of Federal Regulations (CFR), section 122.48 (40 CFR 122.48) requires that all NPDES permits specify monitoring and reporting requirements. California Water Code (CWC) sections 13267 and 13383 also authorize the Central Valley Regional Water Quality Control Board (Central Valley Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program establishes monitoring and reporting requirements, which implement the federal and California regulations.

### I. GENERAL MONITORING PROVISIONS

- A. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and the approval of this Central Valley Water Board.
- B. Effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to mixing with the receiving waters. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.
- C. Chemical, bacteriological, and bioassay analyses of any material required by this Order shall be conducted by a laboratory certified for such analyses by the Department of Public Health (DPH; formerly the Department of Health Services). Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. In the event a certified laboratory is not available to the Discharger for any onsite field measurements such as pH, turbidity, temperature and residual chlorine, such analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine must be kept onsite in the treatment facility laboratory and shall be available for inspection by Central Valley Water Board staff. The Quality Assurance-Quality Control Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.
- D. All chemical, bacteriological and bioassay analyses of any material required by this Order shall be performed in a laboratory certified to perform such analyses by DPH. Laboratories that perform sample analyses must be identified in all monitoring reports submitted to the Central Valley Water Board. The Discharger shall institute a Quality Assurance-Quality Control Program for any onsite field measurements such as pH, turbidity, temperature and residual chlorine. A manual containing the steps followed in this program must be kept onsite and shall be available for inspection by Central Valley Water Board staff. The Discharger must demonstrate sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform these field measurements. The Quality Assurance-Quality Control

Program must conform to USEPA guidelines or to procedures approved by the Central Valley Water Board.

- E.** Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary, at least yearly, to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.
- F.** Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.
- G.** Laboratories analyzing monitoring samples shall be certified by DPH, in accordance with the provision of CWC section 13176, and must include quality assurance/quality control data with their reports.
- H.** The Discharger shall conduct analysis on any sample provided by USEPA as part of the Discharge Monitoring Quality Assurance (DMQA) program. The results of any such analysis shall be submitted to USEPA's DMQA manager.
- I.** The Discharger shall file with the Central Valley Water Board technical reports on self-monitoring performed according to the detailed specifications contained in this Monitoring and Reporting Program.
- J.** The results of all monitoring required by this Order shall be reported to the Central Valley Water Board, and shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this Order. Unless otherwise specified, discharge flows shall be reported in terms of the monthly average and the daily maximum discharge flows.

## II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

**Table E-1. Monitoring Station Locations**

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
	INF-001	Location where a representative sample of the facility's influent can be obtained, prior to any additives, treatment processes, and plant return flows.
	INF-002	Groundwater Corrective Action Program (CAP) Discharge Monitoring
001	EFF-001	Location where a representative sample of the facility's influent can be obtained, prior to any additives, treatment processes, and plant return flows. [Latitude 38° 27' 15"N and Longitude 121° 30' 00"W]
	RSWU-001	Sacramento River at Freeport Bridge
	RSWD-002a	Sacramento River 60 feet downstream of the Discharger Point EFF-001
	RSWD-002b	Sacramento River 350 feet downstream of the Discharge Point EFF-001
	RSWD-003	Sacramento River 4200 feet downstream of Discharge Point No. 001 at Cliff's Marina
	RSWD-004	Sacramento River at River Mile 44
	RSWD-005	Sacramento River at River Mile 43
	ESB	Emergency Storage Basins



### III. INFLUENT MONITORING REQUIREMENTS

#### A. Monitoring Location INF-001

B. The Discharger shall monitor influent to the facility at INF-001 as follows:

**Table E-2a. Influent Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter	Continuous	
Biochemical Oxygen Demand (BOD) (5-day @ 20 Deg. C)	mg/L	24-hr Composite <sup>1</sup>	1/day	
Total Suspended Solids (TSS)	mg/L	24-hr Composite <sup>1</sup>	1/day	
pH	Standard Units	Meter	Continuous	
Electrical Conductivity	µmhos/cm @ 25°C	24-hr Composite <sup>1</sup>	1/week	
Total Dissolved Solids		24-hour Composite <sup>1</sup>	1/month	

<sup>1</sup> 24-hour flow proportional composite.

#### B. Monitoring Location INF-002

a. The Discharger shall monitor influent to the facility at INF-002 as follows:

**Table E-2b Groundwater Corrective Action Program (CAP) Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter/Totalizer	1/month	
Title 22 Metals <sup>1</sup>	µg/L	Grab	2/year	
Nitrate Nitrogen, Total (as N) <sup>5</sup>	mg/L	Grab	2/year	
Ammonia Nitrogen, Total (as N) <sup>3</sup>	mg/L	Grab	2/year	
Total Coliform Organisms	MPN/100 mL	Grab	2/year	
Electrical Conductivity	µmhos/cm @ 25°C	Grab	2/year	
Total Dissolved Solids		Grab	2/year	

<sup>1</sup> Title 22 metals shall include the analyses of arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

## IV. EFFLUENT MONITORING REQUIREMENTS

### A. Monitoring Location EFF-001

1. The Discharger shall monitor final dechlorinated effluent at EFF-001 as follows. If more than one analytical test method is listed for a given parameter, the Discharger must select from the listed methods and corresponding Minimum Level:

**Table E-3a. Effluent Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	mgd	Meter	Continuous	
Chlorine, Total Residual <sup>1</sup>	mg/L	Meter	Continuous	
Sulphur Dioxide or Sodium Bisulfite	mg/L	Meter	Continuous	
Temperature <sup>2</sup>	°F	Meter	Continuous	
Turbidity	NTU	Meter	Continuous	
pH <sup>4</sup>	standard units	Meter	Continuous	
Biochemical Oxygen Demand (5-day @ 20 Deg. C) (BOD <sub>5</sub> )	mg/L	24-hr Composite <sup>7</sup>	1/day	
Total Suspended Solids (TSS)	mg/L	24-hr Composite <sup>7</sup>	1/day	
Total Coliform Organisms	MPN/100 mL	Grab	1/day	
Ammonia Nitrogen, Total (as N) <sup>3</sup>	mg/L	24-hr Composite <sup>7</sup>	1/day	
Temperature	°F	Grab	1/day	
Settleable Solids	mL/L	Grab	1/day	
Dissolved Oxygen	mg/L	Meter	Continuous	
Cryptosporidium	Oocysts /100 mL	Grab	1/week	EPA method 1622/23
Giardia	Cysts/ 100 mL	Grab	1/week	EPA method 1623
Nitrate Nitrogen, Total (as N) <sup>5</sup>	mg/L	24-hr Composite <sup>7</sup>	1/week	
Nitrite Nitrogen, Total (as N) <sup>5</sup>	mg/L	24-hr Composite <sup>7</sup>	1/week	
Total Kjeldahl Nitrogen	mg/L	24-hr Composite <sup>7</sup>	1/week	
Oil and Grease	mg/L	Grab	1/week	
Electrical Conductivity @ 25 Deg. C	µmhos/cm	24-hr Composite <sup>7</sup>	1/week	
Total Dissolved Solids (TDS)	mg/L	24-hr Composite <sup>7</sup>	1/week	
Total Organic Carbon	mg/L	24-hr Composite <sup>7</sup>	1/month	
Aluminum, Total Recoverable <sup>12</sup>	µg/L	24-hr Composite <sup>7,8</sup>	1/month	

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Cyanide, Total Recoverable <sup>5</sup>	µg/L	24-hr Composite <sup>7</sup>	1/month	<sup>9</sup>
Mercury, Total	ng/L	Grab	1/month	EPA Method 1631 <sup>6</sup>
Mercury, Methyl	ng/L	Grab	1/month	EPA Method 1630 <sup>6</sup>
Manganese, Dissolved and Total Recoverable <sup>5</sup>	µg/L	24-hr Composite <sup>7</sup>	1/month	
Copper, Dissolved and Total Recoverable	µg/L	24-hr Composite <sup>7,8</sup>	1/month	
Methylene Chloride <sup>5</sup>	µg/L	Grab	1/month	
Tetrachloroethylene <sup>5</sup>	µg/L	Grab	1/month	
Pentachlorophenol <sup>5</sup>	µg/L	Grab	1/month	EPA method 625 w/ MDL 0.05 µg/L
Dibenzo(a,h)anthracene <sup>5</sup>	µg/L	Grab	1/month	EPA method 625 w/MDL 0.001-0.005 µg/L
1,2-Diphenyl-hydrazine <sup>5</sup>	µg/L	Grab	1/month	EPA method 625 w/ MDL 0.58 µg/L
N-nitrosodimethylamine	ng/L	Grab	1/month	EPA Method 521
Bis-2 (ethylhexyl) phthalate <sup>5,11</sup>	µg/L	Grab	1/month	
Chlorodibromomethane <sup>5</sup>	µg/L	Grab	1/month	
Dichlorobromomethane <sup>5</sup>	µg/L	Grab	1/month	
Carbon Tetrachloride <sup>5</sup>	µg/L	Grab	1/month	
Methyl-tert-butyl ether (MTBE) <sup>5</sup>	µg/L	Grab	1/month	
Chlorpyrifos	µg/L	24-hr Composite <sup>7</sup>	1/month	EPA Method 625M; Method 8141 or equivalent
Diazinon	µg/L	24-hr Composite <sup>7</sup>	1/month	EPA Method 625M; Method 8141 or equivalent
Perchlorate	µg/L	24-hr Composite <sup>7</sup>	1/month	SW-846 Method 6850
Hardness (as CaCO <sub>3</sub> )	mg/L	Grab	1/month	
Alkalinity	mg/L	Grab	1/month	
Effluent/River Dilution Ratio <sup>13</sup>		meter	continuous	
Effluent Diversions <sup>10</sup>	Hr:Min	--	1/month	

- Total chlorine residual must be monitored with a method sensitive to and accurate at the permitted level of 0.01 mg/L. Report the magnitude and duration of all non-zero chlorine residual events within the reporting period.
- Effluent temperature monitoring shall be at the Discharge Point location.
- Concurrent with whole effluent toxicity monitoring.
- pH of effluent shall be measured continuously at one second intervals and tracked as a 20-minute running average. The highest and lowest 20-minute averages each day will be reported.
- For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML technically and economically achievable. For priority pollutant

constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP. Sampling and analysis of Bis (2-ethylhexyl) phthalate shall be conducted using ultra-clean techniques that eliminate the possibility of sample contamination.

- 6 Unfiltered methylmercury and total mercury samples shall be taken using clean hands/dirty hands procedures, as described in U.S. EPA method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, for collection of equipment blanks (section 9.4.4.2), and shall be analyzed by U.S. EPA method 1630/1631 (Revision E) with a method detection limit of 0.02 ng/l for methylmercury and 0.2 ng/l for total mercury.
- 7 24-hour flow proportioned composite.
- 8 Concurrent with hardness monitoring.
- 9 As specified in 40 CFR Part 136; or samples taken at the effluent without preservatives, may be analyzed for cyanide within 15 minutes from collection and must be performed by a laboratory certified for such analyses by the State Department of Public Health.
- 10 A running 12-month summary of effluent diversions to include date, time, duration and reason for the diversion.
- 11 In order to verify if bis (2-ethylhexyl) phthalate is truly present in the effluent discharge, the Discharger shall take steps to assure that sample containers, sampling apparatus, and analytical equipment are not sources of the detected contaminant.
- 12 Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry) analysis methods, as supported by USEPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.
- 13 Running Hourly Average/Running Hourly Average. Report lowest, highest, and average ration calculated for each day.

## B. Monitoring Location EFF-001

1. The Discharger shall monitor final dechlorinated effluent at EFF-001 as follows:

**Table E-3b. Effluent Monitoring**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Electrical Conductivity @ 25 Deg. C	µmhos/cm	Grab	3/year <sup>1</sup>	
Total Dissolved Solids (TDS)	mg/L	Grab	3/year <sup>1</sup>	
Pyrethroids <sup>7</sup>	ng/L	24-hr Composite <sup>5</sup>	3/year <sup>1</sup>	
Priority Pollutants <sup>3</sup>	µg/L	24-hr Composite <sup>5</sup>	3/year <sup>1</sup>	
OCDD and 1,2,3,6,7,8-HpCDD	µg/L	24-hr Composite <sup>5</sup>	3/year <sup>1</sup>	
Standard Minerals <sup>4</sup>	mg/L	Grab	3/year <sup>1</sup>	
Non-CTR Persistent Chlorinated Hydrocarbon Pesticides <sup>6</sup>	µg/L	24-hr Composite <sup>5</sup>	3/year <sup>1</sup>	
Other Constituents of Concern <sup>8</sup>	µg/L	24-hr Composite <sup>5</sup>	3/year <sup>1</sup>	
Hardness (as CaCO <sub>3</sub> )	mg/L	Grab	3/year <sup>1</sup>	
Alkalinity	mg/L	Grab	3/year <sup>1</sup>	

1 -Seven consecutive days, three times per year. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP).

- 2 -Chlorpyrifos and diazinon shall be sampled using EPA Method 625M, Method 8141, or equivalent GC/MS method.
- 3 Priority pollutants include all 126 priority pollutants listed in the California Toxics Rule (40 CFR 131.38). For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is not below the effluent limitation, the detection limit shall be the lowest ML. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP.
- 4 Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e., cation/anion balance).
- 5 24-hour flow proportioned composite.
- 6 Non-CTR Persistent Chlorinated Hydrocarbon pesticides include:
 

Captan	Dicofol	Mirex
2,4-D	Dinoseb	PCNB (Pentachloronitrobenzene)
2,4-DB	Isodrin (an isomer of Aldrin)	Perthane
2,4-D compounds	Kepone (Chlordecone)	Strobane
Dalapon	MCPA	2,4,5-T
Dicamba	MCPP	2,4,5,TP (Silvex)
Dichloran	Methoxychlor	2,4,5-T compounds
Dichloroprop		
- 7 Pyrethroids to include bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin and permethrin.
- 8 Other Constituents of Concern include:
 

Alachlor	Di(2-ethylhexyl)adipate	Picloram
Atrazine	Endothal	Radionuclides
Barium	Ethylene dibromide	Simazine
Bentazon	Flouride	Styrene
Carbofuran	Glyphosate	Sulfate
NEMA and NDEA	MBAS	Sulfide
Chromium, Total	Oxamyl	Trichlorofluoromethane
Diquat	Sulfite	1,1,2-trichloro-1,2,2-trifluoromethane
1,2-dibromo-3-chloropropane (DBCP)	Thiobencarb	Xylenes
Molinate (ordram)	Tributyltin	Disulfoton

## V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

**A. Acute Toxicity Testing.** The Discharger shall conduct acute toxicity testing to determine whether the effluent is contributing acute toxicity to the receiving water. The Discharger shall meet the following acute toxicity testing requirements:

1. Monitoring Frequency – The Discharger shall perform a weekly 96-hour continuous flow-through acute toxicity testing, concurrent with effluent ammonia sampling.
2. Sample Types –The effluent shall be taken at the effluent monitoring location EFF-001.
3. Test Species – **Effective immediately**, the test species shall be fathead minnows (*Pimephales promelas* ). **Effective 1 July 2011** the test species shall be rainbow trout (*Oncorhynchus mykiss*)
4. Methods – The acute toxicity testing samples shall be analyzed using EPA-821-R-02-012, Fifth Edition and its subsequent amendments or revisions.. Temperature,

total residual chlorine, and pH shall be recorded at the time of sample collection. No pH adjustment may be made unless approved by the Executive Officer.

5. Test Failure – If an acute toxicity test does not meet all test acceptability criteria, as specified in the test method, the Discharger must re-sample and re-test as soon as possible, not to exceed 7 days following notification of test failure.
6. Ammonia Toxicity – The acute toxicity testing may be modified to eliminate ammonia-related toxicity until **30 November 2020**, at which time the Discharger shall be required to implement the test without modifications to eliminate ammonia toxicity.

**B. Chronic Toxicity Testing.** The Discharger shall conduct three species chronic toxicity testing on RSWU-001 and RSWD-003 and the effluent at EFF-001 to determine whether the effluent is contributing chronic toxicity to the receiving water. The Discharger shall meet the following chronic toxicity testing requirements:

1. Monitoring Frequency – The Discharger shall perform monthly three species chronic toxicity testing.
2. Sample Types – Effluent samples shall be flow proportional 24-hour composites and shall be representative of the volume and quality of the discharge. The effluent samples shall be taken at the effluent monitoring location EFF-001. The receiving water shall be a grab sample obtained from the RSWU-001 sampling location and RSWD-003 as identified in this Monitoring and Reporting Program.
3. Sample Volumes – Adequate sample volumes shall be collected to provide renewal water to complete the test in the event that the discharge is intermittent.
4. Test Species – Chronic toxicity testing measures sublethal (e.g., reduced growth, reproduction) and/or lethal effects to test organisms exposed to an effluent compared to that of the control organisms. The Discharger shall conduct chronic toxicity tests with:
  - a. The cladoceran, water flea, *Ceriodaphnia dubia* (survival and reproduction test);
  - b. The fathead minnow, *Pimephales promelas* (larval survival and growth test); and
  - c. The green alga, *Selenastrum capricornutum* (growth test).
5. Methods – The presence of chronic toxicity shall be estimated as specified in Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002 and its subsequent amendments or revisions..
6. Reference Toxicant – As required by the SIP, all chronic toxicity tests shall be conducted with concurrent testing with a reference toxicant and shall be reported with the chronic toxicity test results.

7. **Dilutions** – The chronic toxicity testing shall be performed using the dilution series identified in the table, below. The receiving water control shall be used as the diluent (unless the receiving water is toxic).

**Table E-4. Chronic Toxicity Testing Dilution Series**

Sample	Dilutions (%)					Controls	
						Receiving Water	Laboratory Water
% EFF-001	66.4	33.2	16.6	8.3	4.1	100	100
% RSWU-001	100	25	50	75	87.5	0	0
% RSWD-003	100	25	50	75	87.5	0	0
% Laboratory Water	0	0	0	0	0	0	100

8. **Test Failure** – The Discharger must re-sample and re-test as soon as possible, but no later than fourteen (14) days after receiving notification of a test failure. A test failure is defined as follows:
- The reference toxicant test or the effluent test does not meet all test acceptability criteria as specified in the Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002 (Method Manual), and its subsequent amendments or revisions; or
  - The percent minimum significant difference (PMSD) measured for the test exceeds the upper PMSD bound variability criterion in Table 6 on page 52 of the Method Manual. (A retest is only required in this case if the test results do not exceed the monitoring trigger specified in the Special Provision at section VI. 2.a.iii. of the Order.)
9. **Ammonia Toxicity** – The chronic toxicity testing may be modified to eliminate ammonia-related toxicity until **30 November 2020**, at which time the Discharger shall be required to implement the test without modifications to eliminate ammonia toxicity.

**C. WET Testing Notification Requirements.** The Discharger shall notify the Central Valley Water Board within 24-hours after the receipt of test results exceeding the monitoring trigger during regular or accelerated monitoring, or an exceedance of the acute toxicity effluent limitation.

**D. WET Testing Reporting Requirements.** All toxicity test reports shall include the contracting laboratory's complete report provided to the Discharger and shall be in accordance with the appropriate "Report Preparation and Test Review" sections of the method manuals. At a minimum, whole effluent toxicity monitoring shall be reported as follows:

**1. Chronic WET Reporting.** Regular chronic toxicity monitoring results shall be reported to the Central Valley Water Board within 30 days following completion of the test, and shall contain, at minimum:

- a. The results expressed in TUC, measured as 100/NOEC, and also measured as 100/LC50, 100/EC25, 100/IC25, and 100/IC50, as appropriate.
- b. The statistical methods used to calculate endpoints;
- c. The statistical output page, which includes the calculation of the percent minimum significant difference (PMSD);
- d. The dates of sample collection and initiation of each toxicity test; and
- e. The results compared to the numeric toxicity monitoring trigger.

Additionally, the monthly discharger self-monitoring reports shall contain an updated chronology of chronic toxicity test results for the last 12 months expressed in TUC, and organized by test species, type of test (survival, growth or reproduction), and monitoring frequency, i.e., either quarterly, monthly, accelerated, or Toxicity Reduction Evaluation (TRE).

**2. Acute WET Reporting.** Acute toxicity test results shall be submitted with the monthly discharger self-monitoring reports and reported as percent survival. If more than one tank is used in the testing, percent survival for all tanks shall be reported. Additionally, the monthly discharge self-monitoring reports shall contain an updated chronology of the last 12 months of acute toxicity test results.

**3. TRE Reporting.** Reports for TREs shall be submitted in accordance with the schedule contained in the Discharger's approved TRE Workplan.

**4. Quality Assurance (QA).** The Discharger must provide the following information for QA purposes :

- a. Results of the applicable reference toxicant data with the statistical output page giving the species, NOEC, LOEC, type of toxicant, dilution water used, concentrations used, PMSD, and dates tested.
- b. The reference toxicant control charts for each endpoint, which include summaries of reference toxicant tests performed by the contracting laboratory.
- c. Any information on deviations or problems encountered and how they were dealt with.

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## VI. LAND DISCHARGE MONITORING REQUIREMENTS

### A. Monitoring Location ESBs

1. The Discharger shall monitor **diverted influent or treated effluent** at the Emergency Storage Basins as follows:

**Table E-5. Land Discharge Monitoring Requirements**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow	MG	Meter	continuous	
Reason for Diversion				
Duration of Diversion	hours			
Description (Influent or Effluent)				
Dissolved Oxygen	mg/L	Grab	weekly	
pH	su		weekly	
Freeboard	feet		weekly	

## VII. RECLAMATION MONITORING REQUIREMENTS

1. Reclamation sampling shall be done in accordance with Waste Discharge Requirements Order No. 97-146 or subsequent Orders that regulate the reclamation of treated wastewater.

## VIII. RECEIVING WATER MONITORING REQUIREMENTS – SURFACE WATER AND GROUNDWATER

### A. Monitoring Locations RSWU-001, RSWD-002A, RSWD-002B, RSWD-003, RSWD-004 and RSWD-005

1. The Discharger shall monitor Sacramento River at RSWU-001, RSWD-002a<sup>2</sup>, RSWD-002b<sup>2</sup>, RSWD-003, RSWD-004 and RSWD-005 as follows:

**Table E-6a. Receiving Water Monitoring Requirements- Monitoring Locations RSWU-001 through RSWD-005**

Parameter	Units	Sample Type	Minimum Sampling Frequency <sup>1</sup>	Required Analytical Test Method
Flow	cfs	--	Continuous	--
Fecal Coliform Organisms	MPN/100 mL	Grab	1/Quarter	--
pH	standard units	Grab	1/Week	--
Ammonia Nitrogen, Total (as N) <sup>1</sup>	mg/L	Grab <sup>5</sup>	1/Week	--
Dissolved Oxygen	mg/L	Grab	1/Week	--
Electrical Conductivity@ 25°C	µmhos/cm	Grab	1/Week	--
Hardness (as CaCO <sub>3</sub> )	mg/L	Grab	1/Month	--
Alkalinity (as CaCO <sub>3</sub> )	mg/L	Grab	1/Month	--

Parameter	Units	Sample Type	Minimum Sampling Frequency <sup>1</sup>	Required Analytical Test Method
Temperature	°F	Grab	1/Week	--
Turbidity	NTU	Grab	1/Week	--

<sup>1</sup> Temperature and pH shall be collected at the same time as the ammonia sample. Three temperature readings at each location, one sample at the surface, one sample at 12 feet below the surface and one sample at the bottom of the river.

<sup>2</sup> Temperature only

2. The Discharger shall monitor Sacramento River at RSWU-001 and RSWD-003 as follows:

**Table E-6b. Receiving Water Monitoring Requirements – Monitoring Locations RSWU-001 and RSWD-003**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Electrical Conductivity @ 25 Deg. C	µmhos/cm	Grab	3/year <sup>1</sup>	
Total Dissolved Solids (TDS)	mg/L	Grab	3/year <sup>1</sup>	
Perchlorate	µg/L	Grab	3/year <sup>1</sup>	SW-846 Method 6850
Chlorpyrifos	µg/L	grab	3/year <sup>1</sup>	EPA Method 625M; Method 8141, or equivalent GC/MS
Diazonon	µg/L	Grab	3/year <sup>1</sup>	EPA Method 625M Method 8141, or equivalent GC/MS
Disulfoton	µg/L	Grab	3/year <sup>1</sup>	
Perchlorate	µg/L	Grab	3/year <sup>1</sup>	
Pyrethroids <sup>5</sup>	ng/L	Grab	3/year <sup>1</sup>	
Priority Pollutants <sup>2</sup>	µg/L	Grab	3/year <sup>1</sup>	
Standard Minerals <sup>3</sup>	mg/L	Grab	3/year <sup>1</sup>	
Non-CTR Persistent Chlorinated Hydrocarbon Pesticides <sup>4</sup>	µg/L	Grab	3/year <sup>1</sup>	
Other Constituents of Concern <sup>6</sup>	µg/L	Grab	3/year <sup>1</sup>	
Hardness (as CaCO <sub>3</sub> )	mg/L	Grab	3/year <sup>1</sup>	
Alkalinity (as CaCO <sub>3</sub> )	mg/L	Grab	3/year <sup>1</sup>	

1 -Seven consecutive days, three times per year. These samples should be taken during the same time that monthly receiving water samples are taken for the Coordinated Monitoring Program (CMP).

2 Priority pollutants include all 126 priority pollutants listed in the California Toxics Rule (40 CFR 131.38). For priority pollutant constituents with effluent limitations, detection limits shall be below the effluent limitations. If the lowest minimum level (ML) published in Appendix 4 of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Plan or SIP) is

not below the effluent limitation, the detection limit shall be the lowest ML. For priority pollutant constituents without effluent limitations, the detection limits shall be equal to or less than the lowest ML published in Appendix 4 of the SIP.

3 Standard minerals shall include the following: boron, calcium, iron, magnesium, potassium, sodium, chloride, manganese, phosphorus, total alkalinity (including alkalinity series), and hardness, and include verification that the analysis is complete (i.e., cation/anion balance).

4 Non-CTR Persistent Chlorinated Hydrocarbon pesticides include:

Captan	Dicofol	Mirex
2,4-D	Dinoseb	PCNB (Pentachloronitrobenzene)
2,4-DB	Isodrin (an isomer of Aldrin)	Perthane
2,4-D compounds	Kepone (Chlordecone)	Strobane
Dalapon	MCPA	2,4,5-T
Dicamba	MCPP	2,4,5,TP (Silvex)
Dichloran	Methoxychlor	2,4,5-T compounds
Dichloroprop		

5 Pyrethroids to include bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, lambda-cyhalothrin and permethrin.

6 Other Constituents of Concern include:

Aalachlor	Di(2-ethylhexyl)adipate	Picloram
Atrazine	Endothal	Radionuclides
Barium	Ethylene dibromide	Simazine
Bentazon	Flouride	Styrene
Carbofuran	Glyphosate	Sulfate
NEMA and NDEA	MBAS	Sulfide
Chromium, Total	Oxamyl	Trichlorofluoromethane
Diquat	Sulfite	1,1,2-trichloro-1,2,2-trifluoromethane
1,2-dibromo-3-chloropropane (DBCP)	Thiobencarb	Xylenes
Molinate (ordram)	Tributyltin	

a -Chlorpyrifos and diazinon shall be sampled using EPA Method 625M, Method 8141, or equivalent GC/MS method.

3. In conducting the receiving water sampling when discharging to Sacramento River at Discharge Point No. 001, a log shall be kept of the receiving water conditions throughout the reach bounded by Monitoring Locations RSW-001 and RSW-003 and the reach bounded by Monitoring Locations RSW-004 and RSW-005. Attention shall be given to the presence or absence of:

- a. Floating or suspended matter;
- b. Discoloration;
- c. Bottom deposits;
- d. Aquatic life;
- e. Visible films, sheens, or coatings;
- f. Fungi, slimes, or objectionable growths; and
- g. Potential nuisance conditions.

Notes on receiving water conditions shall be summarized in the monitoring report.

## B. Groundwater Monitoring Locations (Not Applicable)

Groundwater monitoring at the facility shall be conducted in accordance with Waste Discharge Requirements R5-2003-0076 or subsequent Orders that regulate the disposal of biosolids and protection of groundwater in the vicinity of the biosolids disposal.

## IX. OTHER MONITORING REQUIREMENTS

### A. Biosolids (Not Applicable)

Biosolids sampling and disposal shall be conducted in accordance with Waste Discharge Requirements Order No. R5-2003-0076 or subsequent Orders that regulate the disposal of biosolids.

### B. Municipal Water Supply

#### 1. Monitoring Location SPL-001

The Discharger shall monitor the municipal water supply at SPL-001 as follows. A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Municipal water supply samples shall be collected at approximately the same time as effluent samples.

**Table E-7. Municipal Water Supply Monitoring Requirements**

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Total Dissolved Solids <sup>1</sup>	mg/L	Grab	1/year	
Electrical Conductivity @ 25°C <sup>1</sup>	µmhos/cm	Grab	1/year	
Standard Minerals <sup>2</sup>	mg/L	Grab	1/year	

1. If the water supply is from more than one source, the total dissolved solids and electrical conductivity shall be reported as a weighted average and include copies of supporting calculations. Alternatively, the Discharger may composite individual grab samples on a flow-weighted basis from multiple locations to represent the water supply within the service area. Compositing samples must be taken in accordance with the sample handling and preservation requirements specified in 40 CFR Part 136.
2. Standard minerals shall include all major cations and anions and include verification that the analysis is complete (i.e., cation/anion balance).

## X. REPORTING REQUIREMENTS

### B. General Monitoring and Reporting Requirements

1. The Discharger shall comply with all Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.
2. Upon written request of the Regional Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).
3. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Regional Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an

estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the compliance time schedule.

4. The Discharger shall report to the Regional Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "*Emergency Planning and Community Right to Know Act*" of 1986.

### C. Self Monitoring Reports (SMRs)

2. At any time during the term of this permit, the State Water Board or the Central Valley Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (<http://www.waterboards.ca.gov/ciwqs/index.html>). Until such notification is given, the Discharger shall submit hard copy SMRs. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.
3. The Discharger shall report in the SMR the results for all monitoring specified in this Monitoring and Reporting Program under sections III through IX. The Discharger shall submit monthly SMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.
4. Monitoring periods and reporting for all required monitoring shall be completed according to the following schedule:

**Table E-8. Monitoring Periods and Reporting Schedule**

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
Continuous	Permit effective date	All	First day of second calendar month following month of sampling
1/Day	Permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.	First day of second calendar month following month of sampling
1/Week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	First day of second calendar month following month of sampling

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period	SMR Due Date
2/Week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	First day of second calendar month following month of sampling
3/Week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday	First day of second calendar month following month of sampling
1/Month	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1 <sup>st</sup> day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
2/Month	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1 <sup>st</sup> day of calendar month through last day of calendar month	First day of second calendar month following month of sampling
1/Quarter	Closest of 1 January, 1 April, 1 July, or 1 October following (or on) permit effective date	1 January through 31 March 1 April through 30 June 1 July through 30 September 1 October through 31 December	1 May 1 August 1 November 1 February
1/Year	1 January following (or on) permit effective date	January 1 through December 31	1 February
2/Year	Closest of 1 January or 1 July following (or on) permit effective date	1 January through 30 June 1 July through 31 December	1 August 1 February
3/Year	Closest of 1 January, 1 May or 1 September following (or on) permit effective date	1 January through 30 April 1 May through 31 August 1 September through 31 December	1 June 1 October 1 February

- 4. Reporting Protocols.** The Discharger shall report with each sample result the applicable reported Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

- 5.** Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
- 6.** Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical

estimates of data quality may be percent accuracy (+ a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

7. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.
8. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.
9. **Compliance Determination.** Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above and in Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional Water Board and the State Water Board, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).
10. **Multiple Sample Data.** When determining compliance with an AMEL, AWEL, or MDEL for priority and non-priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:
  - a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.
  - b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.
11. The Discharger shall submit SMRs in accordance with the following requirements:
  - a. In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly whether the discharge complies with waste discharge requirements. The highest daily maximum for the month, monthly and weekly averages, and medians, and removal efficiencies (%) for BOD<sub>5</sub> and TSS, shall be determined and recorded as needed to demonstrate compliance. The Discharger is not required to duplicate

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the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

- b. With the exception of flow, all constituents monitored on a continuous basis (metered), shall be reported as daily maximums, daily minimums, and daily averages; flow shall be reported as the total volume discharged per day for each day of discharge.
- c. A letter transmitting the SMRs shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions.
- d. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

Regional Water Quality Control Board  
Central Valley Region  
NPDES Compliance and Enforcement Unit  
11020 Sun Center Dr., Suite #200  
Rancho Cordova, CA 95670-6114

#### **D. Discharge Monitoring Reports (DMRs)**

- 1. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

<b>STANDARD MAIL</b>	<b>FEDEX/UPS/ OTHER PRIVATE CARRIERS</b>
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15 <sup>th</sup> Floor Sacramento, CA 95814



2. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated will not be accepted unless they follow the exact same format of EPA Form 3320-1.

## E. Other Reports

1. **Progress Reports.** As specified in the compliance time schedules required in the Special Provisions contained in section VI of the Order, progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule to meet the final compliance date, and the remaining tasks to meet the final compliance date.

**Table E-9. Reporting Requirements for Special Provisions Progress Reports**

Special Provision	Reporting Requirements
Pollution Prevention Plan for mercury (Section VI.C.3.a)	<b>1 December</b> , annually, after approval of workplan
Title 22 Disinfection Requirements (Section VI.C.7.a)	<b>1 December</b> , annually, until final compliance
Compliance Schedules for Final Effluent Limitations for ammonia and chlorpyrifos, compliance with final effluent limitations. (Section VI.C.7.b)	<b>1 June</b> , annually, until final compliance

2. The Discharger shall report the results of any special studies, acute and chronic toxicity testing, TRE/TIE, and Pollution Prevention Plans required in this Order. The Discharger shall report the progress in satisfaction of compliance schedule dates specified in the Special Provision at section VI.C.7 of this Order. The Discharger shall submit reports with the first monthly SMR scheduled to be submitted on or immediately following the report due date AND/OR in compliance with SMR reporting requirements described in subsection X.B. above.
3. Within 60 days of permit adoption, the Discharger shall submit a report outlining minimum levels, method detection limits, and analytical methods for approval, with a goal to achieve detection levels below applicable water quality criteria. At a minimum, the Discharger shall comply with the monitoring requirements for CTR constituents as outlined in section 2.3 and 2.4 of the SIP.
4. The Discharger's sanitary sewer system collects wastewater using sewers, pipes, pumps, and/or other conveyance systems and directs the raw sewage to the wastewater treatment plant. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the wastewater treatment plant. Sanitary sewer overflows are prohibited by this Order. All violations must be reported as required in Standard Provisions. Facilities (such as wet wells, regulated impoundments, tanks, highlines, etc.) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary

sewer overflows, provided that the waste is fully contained within these temporary storage facilities.

**5. Annual Operations Report.** By 30 January of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

- a. The names, certificate grades, and general responsibilities of all persons employed at the Facility.
- b. The names and telephone numbers of persons to contact regarding the plant for emergency and routine situations.
- c. A statement certifying when the flow meter(s) and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration.
- d. A statement certifying whether the current operation and maintenance manual, and contingency plan, reflect the wastewater treatment plant as currently constructed and operated, and the dates when these documents were last revised and last reviewed for adequacy.
- e. The Discharger may also be requested to submit an annual report to the Central Valley Water Board with both tabular and graphical summaries of the monitoring data obtained during the previous year. Any such request shall be made in writing. The report shall discuss the compliance record. If violations have occurred, the report shall also discuss the corrective actions taken and planned to bring the discharge into full compliance with the waste discharge requirements.

**6. Annual Pretreatment Reporting Requirements**

- a. The Discharger shall submit annually a report to the Regional Water Board, with copies to USEPA Pacific Southwest Region and the State Water Board, describing its pretreatment activities over the previous 12 months. In the event that the Discharger is not in compliance with any conditions or requirements of this Order, then the Discharger shall also include the reasons for noncompliance and state how and when the Discharger shall comply with such conditions and requirements. This annual report shall cover operations from 1 January through 31 December and is due by **28 February** of each year. The report shall contain, but not be limited to, the following information:
  - i. A summary of analytical results from representative, flow proportioned, 24-hour composite sampling of the POTW's influent and effluent for those pollutants USEPA has identified under section 307(a) of the CWA which are known or suspected to be discharged by nondomestic users. This will consist of an annual full priority pollutant scan, with quarterly samples analyzed only for those pollutants detected in the full scan. The Discharger is not required to sample and analyze for asbestos. Sludge shall be sampled during the

same 24-hour period and analyzed for the same pollutants as the influent and effluent sampling and analysis. The sludge analyzed shall be a composite sample of a minimum of 12 discrete samples taken at equal time intervals over the 24-hour period. Wastewater and sludge sampling and analysis shall be performed at least annually. The Discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants which the Discharger believes may be causing or contributing to interference, pass through, or adversely impacting sludge quality. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto.

- ii. A discussion of Upset, Interference, or Pass Through incidents, if any, at the treatment plant which the Discharger knows or suspects were caused by nondomestic users of the POTW system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of, the nondomestic user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any additional limitations, or changes to existing requirements, may be necessary to prevent pass through or interference, or noncompliance with sludge disposal requirements.
- iii. The cumulative number of industrial users that the Discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.
- iv. An updated list of the Discharger's significant industrial users (SIUs) including their names and addresses, and a list of deletions, additions, and SIU name changes keyed to the previously submitted list. The Discharger shall provide a brief explanation for each change. The list shall identify the SIUs subject to federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall also indicate the SIUs subject to federal categorical standards by specifying which set(s) of standards are applicable to each SIU. The list shall also indicate which SIUs are subject to local discharge limitations.
- v. The Discharger shall characterize the compliance status of each SIU through the year of record by providing a list or table which includes the following information for each industrial user:
  - (a) Name of the SIU;
  - (b) Category, if subject to federal categorical standards;
  - (c) The type of wastewater treatment or control processes in place;
  - (d) The number of samples taken by the Discharger during the year;
  - (e) The number of samples taken by the SIU during the year;

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- (f) For an SIU subject to discharge requirements for total toxic organics, whether all required certifications were provided;
- (g) Whether the SIU complied with baseline monitoring report requirements (where applicable);
- (h) Whether the SIU consistently achieved compliance;
- (i) Whether the SIU inconsistently achieved compliance;
- (j) A list of the standards violated during the year. Identify whether the violations were for categorical standards or local limits;
- (k) Whether the SIU is in significant noncompliance with applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);
- (l) Whether the SIU complied with schedule to achieve compliance (include the date final compliance is required);
- (m) Whether the SIU did not achieve compliance and not on a compliance schedule; and
- (n) Whether compliance status unknown.
- (o) A summary of enforcement or other actions taken during the year to return the SIU to compliance. Describe the type of action, final compliance date, and the amount of fines and penalties collected, if any. Describe any proposed actions for bringing the SIU into compliance.

A report describing the compliance status of each industrial user characterized by the descriptions in items a. through o. above shall be submitted for each calendar quarter **within 21 days of the end of the quarter**. The report shall identify the specific compliance status of each such industrial user and shall also identify the compliance status of the POTW with regards to audit/pretreatment compliance inspection requirements. If none of the aforementioned conditions exist, at a minimum, a letter indicating that all industries are in compliance and no violations or changes to the pretreatment program have occurred during the quarter must be submitted. The information required in the fourth quarter report shall be included as part of the annual report. This quarterly reporting requirement shall commence upon issuance of this Order.

- vi. A brief description of any programs the Discharger implements to reduce pollutants from nondomestic users that are not classified as SIUs.
- vii. A brief description of any significant changes in operating the pretreatment program which differ from the previous year including, but not limited to, changes concerning the program's administrative structure, local industrial

discharge limitations, monitoring program or monitoring frequencies, legal authority or enforcement policy, funding mechanisms, or staffing levels.

- viii.** A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.
- ix.** A summary of activities to involve and inform the public of the program including a copy of the newspaper notice, if any, required under 40 CFR 403.8(f)(2)(vii).
- x.** A summary of the inspection and sampling activities conducted by the Discharger during the past year to gather information and data regarding the industrial users. The summary shall include:
  - (a)** the names and addresses of the industrial users subjected to surveillance and an explanation of whether they were inspected, sampled, or both and the frequency of these activities at each user; and
  - (b)** the conclusions or results from the inspection or sampling of each industrial user.
- xi.** A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:
  - (a)** Warning letters or notices of violation regarding the industrial users' apparent noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the apparent violation concerned the federal categorical standards or local discharge limitations.
  - (b)** Administrative orders regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
  - (c)** Civil actions regarding the industrial users' noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
  - (d)** Criminal actions regarding the industrial users noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.
  - (e)** Assessment of monetary penalties. For each industrial user identify the amount of the penalties.

**(f)** Restriction of flow to the POTW.

**(g)** Disconnection from discharge to the POTW.

- b.** The Discharger shall submit a semi-annual SIU noncompliance status report to the Regional Water Board, USEPA Pacific Southwest Region, and the State Water Board. The report shall cover the period of 1 January through 30 June, and shall be submitted by 31 July. The report shall contain:
- i.** The name and address of all SIUs which violated any discharge or reporting requirements during the report period;
  - ii.** A description of the violations including whether any discharge violations were for categorical standards or local limits;
  - iii.** A description of the enforcement or other actions that were taken to remedy the noncompliance; and
  - iv.** The status of active enforcement and other actions taken in response to SIU noncompliance identified in previous reports.

Duplicate signed copies of these Pretreatment Program reports shall be submitted to the Regional Water Board and the:

State Water Resources Control Board  
Division of Water Quality  
1001 I Street or P.O. Box 100  
Sacramento, CA 95812

and the

Regional Pretreatment Coordinator  
CWA Compliance Office (WTR-7)  
75 Hawthorne Street  
San Francisco, CA 94105-3901

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## ATTACHMENT F – FACT SHEET

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## ATTACHMENT F – FACT SHEET

As described in the Findings in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for Dischargers in California. Only those sections or subsections of this Order that are specifically identified as “not applicable” have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as “not applicable” are fully applicable to this Discharger.

### I. PERMIT INFORMATION

The following table summarizes administrative information related to the Facility.

**Table F-1. Facility Information**

<b>WDID</b>	5A340108002
<b>Discharger</b>	Sacramento Regional County Sanitation District
<b>Name of Facility</b>	Sacramento Regional Wastewater Treatment Plant
<b>Facility Address</b>	8521 Laguna Station Road
	Elk Grove, CA 95758
	Sacramento County
<b>Facility Contact, Title and Phone</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Authorized Person to Sign and Submit Reports</b>	Stanley R. Dean, District Engineer, (916) 875-9101
<b>Mailing Address</b>	10060 Goethe Road, Sacramento, CA 95827
<b>Billing Address</b>	Same
<b>Type of Facility</b>	POTW
<b>Major or Minor Facility</b>	Major
<b>Threat to Water Quality</b>	1
<b>Complexity</b>	A
<b>Pretreatment Program</b>	Y
<b>Reclamation Requirements</b>	Master Water Reclamation Permit No. 97-146
<b>Facility Permitted Flow</b>	181 million gallons per day (mgd)
<b>Facility Design Flow</b>	181 mgd
<b>Watershed</b>	Sacramento Watershed
<b>Receiving Water</b>	Sacramento River
<b>Receiving Water Type</b>	Sacramento-San Joaquin Delta

- A.** Sacramento Regional County Sanitation District (hereinafter Discharger) is the owner and operator of Sacramento Regional Wastewater Treatment Plant (hereinafter Facility), a Publicly-Owned Treatment Works.

For the purposes of this Order, references to the “discharger” or “permittee” in

applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

- B.** The Facility discharges wastewater to the Sacramento River within the Sacramento-San Joaquin Delta, a water of the United States, and is currently regulated by Order No. 5-00-188 which was adopted on 4 August 2000 and expired on 1 August 2005. The terms and conditions of the current Order have been automatically continued and remain in effect until new Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit are adopted pursuant to this Order.
- C.** The Discharger filed a report of waste discharge and submitted an application for renewal of its Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit on 1 February 2005. Supplemental information was requested on 19 August 2008 and received on 24 August 2010. A site visit was conducted on 22 July 2008, to observe operations and collect additional data to develop permit limitations and conditions.

## **II. FACILITY DESCRIPTION**

The Discharger provides wastewater treatment service to the Cities of Sacramento, Folsom, West Sacramento and the Sacramento Area Sewer District. The Sacramento Area Sewer District service area includes the Cities of Elk Grove, Rancho Cordova, Citrus Heights, as well as, portions of the unincorporated areas of Sacramento County. The population served is approximately 1.3 million people. The collection systems are owned and operated by the various contributing agencies and not by the Discharger, and are regulated under the State Water Board general order, Water Quality Order No. 2006-0003, effective November 2006. The City of Sacramento operates both a separate sewer collection system and a combined (storm water and wastewater) collection system. During wet weather the Facility is contracted to accept up to 60 mgd of wastewater and storm runoff from the downtown Sacramento combined collection system. Combined collection flows in excess of 60 mgd are managed by the Combined Wastewater Collection and Treatment System (CWCTS) operated by the City of Sacramento. The CWCTS discharge is governed by Waste Discharge Requirements Order No. 2010-0004 issued to the City of Sacramento. Depending on treatment and conveyance capacity, flow in excess of 60 mgd maybe received at the Facility.

### **A. Description of Wastewater and Biosolids Treatment or Controls**

The Facility is staffed and operated 24 hours per day and consists of influent pumps, septage receiving station, mechanical bar screening; aerated grit handling, grit classifiers that wash and dewater grit, covered primary sedimentation tanks, pure oxygen biological treatment by activated sludge, secondary sedimentation, disinfection with sodium hypochlorite and dechlorination with sulfur dioxide. Effluent can be diverted to lined and unlined emergency storage basins as needed to meet effluent dilution, thermal, and disinfection requirements or divert excess flows. Odors are controlled through stripping towers.

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Solids are thickened by dissolved air floatation and gravity belt thickeners. Primary and secondary sludge is mixed and sent to anaerobic digesters for fifteen days, stored at the solids storage basins for three to five years then harvested and injected into lined dedicated land disposal sites. Some biosolids are recycled with the Synagro Organic Fertilizer Company and the Discharger can dispose of biosolids at the Keifer Landfill as a disposal option. Separate Waste Discharge Requirements (Order No. R5-2003-0076) in conformance with Title 27, California Code of Regulations, Division 2, Subdivision 1 cover the biosolids and solids storage and disposal facilities, the Class II dedicated land treatment units, unclassified solids storage basins, the Class III grit and screenings landfill closure and the groundwater Corrective Action Program (CAP).

The Facility discharges to the Sacramento River just downstream of the Freeport Bridge via an outfall diffuser. The outfall diffuser is approximately 300 feet long with 74 ports and is placed perpendicular to the river flow. At times, the river flows in the reverse direction northeast towards the City of Sacramento, due to tidal activity during low river flows. The Discharger diverts its discharge to emergency basins whenever these conditions exist. The Discharger has determined in studies that River flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent through the outfall diffuser.

The current average dry weather flows are approximately 141 mgd and the Facility has a designed capacity of 181 mgd. The Discharger prepared a "Sacramento Regional Wastewater Treatment Plant Capacity Rating Study" by Carollo Engineers, February 2005, which concluded the overall capacity for the treatment plant is approximately 207 mgd. The Discharger proposed to expand the treatment plant capacity to 218 mgd as described in the "Draft Environmental Impact Report (EIR) for the Sacramento Regional County Sanitation District – Sacramento Regional Wastewater Treatment Plant 2020 Master Plan", August 2003 and the Responses to Comments and Additional Information Sacramento Regional County Sanitation District – Sacramento Regional Wastewater Treatment Plant 2020 Master Plan", 21 May 2004. However, the EIR was successfully challenged by the Contra Costa Water District and is described in Case No. 05CS00908, Superior Court of California, County of Sacramento, dated 28 November 2007 under Judge Raymond Cadei. Oral arguments are expected late in 2010. The California Environmental Quality Act (CEQA) requirements will not be completed until the case is resolved.

On 11 June 2010, the Discharger withdrew its request for increasing the SRWTP capacity from 181 mgd to 218 mgd. The Discharger cited slow growth and potential reclamation as the reasons not to expand the wastewater treatment plant at this time.

## **B. Discharge Points and Receiving Waters**

1. The Facility is located in Section 19, T7N, R5E, MDB&M, as shown in Attachment B, a part of this Order.

2. Treated municipal wastewater is discharged at Discharge Point No. 001 to Sacramento River, a water of the United States and within the legal boundary of the Sacramento-San Joaquin Delta at a point latitude 38° 27' 15" N and longitude 121° 30' 00" W.
3. The Facility and the Discharge Point are located near the community of Freeport outside the City of Sacramento and within the Sacramento River Watershed.

### C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations and Discharge Specifications contained in Order No. 5-00-188 for discharges from Discharge Point No. 001 and representative monitoring data from the term of Order No. Order No. 5-00-188 are as follows:

**Table F-2. Historic Effluent Limitations and Monitoring Data**

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Biochemical Oxygen Demand (5-day @ 20°C)	mg/L	30	45	60	11.1	13	28
	lbs/day <sup>1,2</sup>	45,286	67,929	90,572	13,136	16,336	31,283
		98,078	147,118	196,157			
Total Suspended Solids	mg/L	30	45	90	11	15	25
	lbs/day <sup>1,2</sup>	45,286	67,929	90,572	12,266	17,219	37,232
		98,078	147,118	196,157			
Settleable Solids	mL/L	0.1	--	0.5 <sup>3</sup>	0.0	--	2.5

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Total Coliform Organisms	MPN/100 mL	--	23 median	500 <sup>4</sup>	--	30	500
Oil & Grease	mg/L	10	--	--	<5.5	--	
Lead	µg/L	--	--	(5.1) <sup>5</sup> 7.8	--	--	1.19
	lbs/day <sup>1,2</sup>			12			1.3
				26			
Silver	µg/L	--	--	(0.57) <sup>5</sup> 0.72	--	--	0.149
	lbs/day <sup>1,2</sup>			1.1			0.175
				2.3			
Mercury	lbs/year	5.1 <sup>6</sup>	--	--	--	--	2.49
Copper	µg/L	--	--	(9.7) <sup>5</sup> 22.8	--	--	6.34
	lbs/day <sup>1,2</sup>			34			9.9
				75			
Cyanide	µg/L	--	--	(6.1) <sup>5</sup> 10.8	--	--	10
	lbs/day <sup>1,2</sup>			16			10.9
				35			
Zinc	µg/L			(46.7) <sup>5</sup> 69.8	--	--	33.5
	lbs/day <sup>1,2</sup>			105			37
				228			
Bromodichloromethane	µg/L	3.6	--	7.2	--	--	3.4
	lbs/day <sup>1,2</sup>	5.4		11			2.7
		12		24			
Lindane (lbs/yr)	µg/L		--	ND <sup>3</sup>	--	--	<0.003
	lbs/year	19.6 <sup>6</sup>	--		--	--	1.29
Methylene chloride	µg/L	14.3	--	32.1	--	--	5.4
	lbs/day <sup>1,2</sup>	22		48			6.4
		47		105			
Chloroform	µg/L	37.3	--	55.3	--	--	51
	lbs/day <sup>1,2</sup>	56		83			61.5
		122		181			
Chlorine, Total Residual	mg/L	0.011	--	0.018	--	--	0.07
	lbs/day <sup>1,2</sup>	17	--	27	--	--	82
		36	--	59	--	--	
Tetrachloroethylene	µg/L	14.1	--	35.6	--	--	0.9
Bis-2 (ethylhexyl) phthalate	mg/L	8.6	--	19.1	--	--	8.1
	lbs/day <sup>1,2</sup>	13		29			9.7
		28		62			
pH	standard units	--	--	6.0 – 7.5 <sup>7</sup>	--	--	6 – 7.5

Parameter	Units	Effluent Limitation			Monitoring Data (From June 2005 – July 2008) <sup>a</sup>		
		Average Monthly	Average Weekly	Average Daily	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
Average Dry Weather Flow	MGD	181	--	--	147	--	--
Peak Wet Weather Flow	MGD	392	--	--	179		345
Acute Toxicity	% Survival	8	--	--	--	--	50% (lowest)
Temperature	°F	9	--	--	--	--	23 over natural receiving water

- <sup>1</sup> Based on average dry weather flow capacity of 181 mgd, applicable from May through October
- <sup>2</sup> Based on peak weather flow capacity of 392 mgd, applicable from November through April.
- <sup>3</sup> Daily Maximum.
- <sup>4</sup> Daily Maximum limit shall not be exceeded in any two (2) consecutive days.
- <sup>5</sup> (Trigger) and interim limits. Exceedance of the trigger concentration is a not violation, but when exceeded requires immediate investigation and action plan. Trigger concentration are not subsequently expressed as mass limits. Interim limits were pending additional studies, however final limits were never established under Order No. 5-00-188.
- <sup>6</sup> Based on lbs/year.
- <sup>7</sup> The discharge shall not have a pH value of less than 6.0 nor greater than 8.5 as calculated by a running 20-minute average of continuously monitored effluent pH nor have a pH value greater than 7.5 as calculated by a running 1-hour average of continuously monitored effluent pH. As discussed in Finding 23 and 24 the upper limit of 7.5 as 1-hour average is an interim limit until completion of further studies at which time its necessity will be reassessed.
- <sup>8</sup> Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:  
Minimum for any one bioassay----- 70%  
Median for any three or more consecutive bioassays ----- 90%
- <sup>9</sup> The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April or by more than 20°F from 1 May through 30 September.

## D. Compliance Summary

Year:	2005	2006	2007	2008	2009
Chlorine Residual	2	0	1	0	0
Minimum Dilution	0	1	0	0	0
Total Coliform Organisms	0	0	1	0	0
Acute Aquatic Toxicity	0	0	0	6	9
Settleable Solids	0	0	0	1	0

## E. Planned Changes – Not Applicable

### III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the applicable plans, policies, and regulations identified in the Findings in section II of this Order. The applicable plans, policies, and regulations relevant to the discharge include the following:

#### A. Legal Authorities

This Order is issued pursuant to regulations in the Clean Water Act (CWA) and the California Water Code (CWC) as specified in the Finding contained at section II.C of this Order.

#### B. California Environmental Quality Act (CEQA)

This Order meets the requirements of CEQA as specified in the Finding contained at section II.E of this Order.

#### C. State and Federal Regulations, Policies, and Plans

**1. Water Quality Control Plans.** This Order implements the following water quality control plans as specified in the Finding contained at section II.H of this Order.

- a. *Water Quality Control Plan, Fourth Edition (Revised February 2007), for the Sacramento and San Joaquin River Basin (Basin Plan).*
- b. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan)*
- c. *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan)*

For purposes of the Thermal Plan, the Discharger is considered to be an Existing Discharger of Elevated Temperature Waste. The Thermal Plan in section 5.A. contains the following temperature objectives for surface waters that are applicable to this discharge:

##### *“5. Estuaries*

##### *A. Existing discharges*

*(1) Elevated temperature waste discharges shall comply with the following:*

- a. *The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.*

- b. Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.*
- c. No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.*
- d. Additional limitations shall be imposed when necessary to assure protection of beneficial uses.*

The Central Valley Water Board, on 26 May 1989, adopted Resolution No. 89-094 granting an exception to objectives 5A(I)(a) (from 1 October to 30 April) and 5A(I)(b) of the Thermal Plan. Additionally, Resolution 89-094 requires that the temperature of the discharge shall not exceed the natural receiving water temperature by more than 25°F from 1 October through 30 April. The State Water Board, on 20 September 1990, adopted Resolution No. 90-103 approving and modifying Central Valley Water Board Resolution No.89-094. State Water Board Resolution No. 90-103 approved the exception to objective 5A(1)(a), but not the one to 5A(1)(b). It further required a study of the feasibility of meeting the existing objective,5A(I)(b). The Discharger submitted the required study in a report in October 1991, with supplements in November and December 1991. Based on the study, the State Water Board adopted Resolution No. 92-82 on 22 October 1992, granting the Discharger an exception to objective 5A(I)(b). Specifically, the exception allows a maximum increase of 2 °F in a zone that does not exceed 25 percent of the cross sectional area of the main river channel at any point. The exception also limited any excursion of objective 5A(I)(b) to no more than one hour per day as an average in any thirty-day period when the upstream temperature of the Sacramento River is 65 °F or greater. This exception was carried over in Waste Discharge Order No. 5-00-188.

- 2. National Toxics Rule (NTR) and California Toxics Rule (CTR).** This Order implements the NTR and CTR as specified in the Finding contained at section II.I of this Order.
- 3. State Implementation Policy (SIP).** This Order implements the SIP as specified in the Finding contained at section II.I of this Order.
- 4. Alaska Rule.** This Order is consistent with the Alaska Rule as specified in the Finding contained at section II.L of this Order.
- 5. Antidegradation Policy.** As specified in the Finding contained at section II.N of this Order and as discussed in detail in the Fact Sheet (Attachment F, Section IV.D.4.), the discharge is consistent with the antidegradation provisions of 40 CFR section 131.12 and State Water Resources Control Board (State Water Board) Resolution 68-16.



- 6. Anti-Backsliding Requirements.** This Order is consistent with anti-backsliding policies as specified in the Finding contained at section II.M of this Order. Compliance with the anti-backsliding requirements is discussed in the Fact Sheet (Attachment F, Section IV.D.3).

**7. Emergency Planning and Community Right to Know Act**

Section 13263.6(a) of the CWC, requires that *“the Regional Water Board shall prescribe effluent limitations as part of the waste discharge requirements of a POTW for all substances that the most recent toxic chemical release data reported to the state emergency response commission pursuant to Section 313 of the Emergency Planning and Community Right to Know Act of 1986 (42 U.S.C. Sec. 11023) (EPCRA) indicate as discharged into the POTW, for which the State Water Board or the Regional Water Board has established numeric water quality objectives, and has determined that the discharge is or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to, an excursion above any numeric water quality objective”*.

The most recent toxic chemical data report indicates all reportable off-site releases or discharges to the collection system for this Facility were included in the effluent database. Off-site discharges included chromium and chromium compounds, copper and copper compounds, lead and lead compounds, styrene and zinc compounds. Therefore, a reasonable potential analysis based on information from EPCRA includes the data in the effluent database. Based on information from EPCRA, there is no additional reasonable potential to cause or contribute to an excursion above any numeric water quality objectives included within the Basin Plan or in any State Water Board plan, so no effluent limitations are included in this permit pursuant to CWC section 13263.6(a).

However, as detailed elsewhere in this Order, available effluent data indicate that there are constituents present in the effluent that have a reasonable potential to cause or contribute to exceedances of water quality standards and require inclusion of effluent limitations based on federal and state laws and regulations.

- 8. Storm Water Requirements.** USEPA promulgated federal regulations for storm water on 16 November 1990 in 40 CFR Parts 122, 123, and 124. The NPDES Industrial Storm Water Program regulates storm water discharges from wastewater treatment facilities. Wastewater treatment plants are applicable industries under the storm water program and are obligated to comply with the federal regulations. The Discharger captures all storm water from the process areas, chemical storage facilities, administration and maintenance buildings, parking lots, undeveloped drainage areas immediately surrounding the Facilities and the Cogeneration/Ice Plant. All collected stormwater is conveyed to the stormwater pump station and is pumped to the headworks. Once or twice a year, during heavy storms, stormwater is discharged to Laguna Creek when the pumping capacity to the headworks is

exceeded. This discharge is covered under the general Waste Discharge Order No. 97-03-DWQ.

- 9. Endangered Species Act.** This Order is consistent with the Endangered Species Act as specified in the Finding contained at section II.P of this Order.

#### **D. Impaired Water Bodies on CWA 303(d) List**

- 1.** Under section 303(d) of the 1972 CWA, states, territories and authorized tribes are required to develop lists of water quality limited segments. The waters on these lists do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. On 30 November 2006 USEPA gave final approval to California's 2006 section 303(d) List of Water Quality Limited Segments. The Basin Plan references this list of Water Quality Limited Segments (WQLSs), which are defined as “...*those sections of lakes, streams, rivers or other fresh water bodies where water quality does not meet (or is not expected to meet) water quality standards even after the application of appropriate limitations for point sources (40 CFR Part 130, et seq.).*” The Basin Plan also states, “*Additional treatment beyond minimum federal standards will be imposed on dischargers to [WQLSs]. Dischargers will be assigned or allocated a maximum allowable load of critical pollutants so that water quality objectives can be met in the segment.*” The listing for the Sacramento-San Joaquin Delta includes: Chlorpyrifos, DDT, Diazinon, Exotic Species, Group A Pesticides, Mercury, Polychlorinated byphenyls (PCBs) and unknown toxicity.
- 2. Total Maximum Daily Loads (TMDLs).** USEPA requires the Central Valley Water Board to develop TMDLs for each 303(d) listed pollutant and water body combination.

**Table F-3. TMDLs in Delta**

Pollutant	Potential Sources	Proposed TMDL Completion
Chlorpyrifos	Agriculture, Urban Runoff/Storm Sewers	2019
DDT	Agriculture	2011
Diazinon	Agriculture, Urban Runoff/Stormwater Sewers	2019
Exotic Species	Source Unknown	2019
Group A Pesticides	Agriculture	2011
Mercury	Resource Extraction	Phase I completed
PCBs (Polychlorinated biphenyls)	Source Unknown	2019
Unknown Toxicity	Source Unknown	2019

The 303(d) listings and TMDLs have been considered in the development of the Order. A pollutant-by-pollutant evaluation of each pollutant of concern is described in section VI.C.3. of this Fact Sheet.

## E. Other Plans, Policies and Regulations

**Title 27, California Code of Regulations (CCR), section 20005 et seq. (hereafter Title 27)** Title 27 regulations contains the State Water Resources Control Board's water quality regulations for discharges of solid wastes to land. Exemption from Title 27 is provided if the discharges of domestic sewage or treated effluent are regulated by WDRs and are consistent with applicable water quality objectives and treatment or storage facilities associated with municipal wastewater treatment plants, provided solid wastes are discharged only in accordance with Title 27. Historically discharges of wastewater to land, including but not limited to evaporation ponds or percolation ponds, storage ponds have been exempt from the requirements of Title 27, CCR, based on section 20090 et seq. However, the State Water Resources Control Board issued a decision on another municipal wastewater treatment plant, the City of Lodi, that storage basins must be part of the treatment process in order to be included in the Title 27 exemptions.

The Facility contains solids storage, land disposal and emergency influent and effluent storage. A determination has been made by the Central Valley Water Board whether the facilities meet the exemptions from Title 27. These facilities include the Solid Storage Basins (SSBs) and Dedicated Land Disposal areas (DLDs) and Emergency

Storage Basins. The Central Valley Water Board's findings regarding Title 27 exemptions are discussed below.

1. **Solids Storage Basins (SSBs).** The SSBs are unlined storage ponds for anaerobically digested primary and secondary sludge and scum. The SSBs receive about 6,000 tons of wet sludge per day. The digested sludge has about 0.4 to 3% solids and is composed of 50 to 80% volatile solids. Digested sludge may also contain variable concentrations of contaminants such as heavy metals, chlorinated hydrocarbons and pathogens. The sludge remains in the basins from three to five years prior to discharge to the DLDs. The SSBs provide additional stabilization treatment, storage and evaporation of the sludge. The EIR states that settled sludge has created a barrier to groundwater similar to being lined. In June 2009, the District installed six new wells to monitor groundwater water quality. The results from those wells will determine if the SSBs are impacting groundwater and need to be lined. The SSBs are governed by Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities. Order No. R5-2003-0076 is scheduled to be renewed in 2013.
2. **Dedicated Land Disposal Areas (DLDs).** The DLDs are lined land disposal units that receive stabilized sludge from the SSBs. The semi-liquid sludge is applied to the DLDs by subsurface injection during dry seasons. To prevent leaching of heavy metals, the District applies lime to maintain proper soil pH. The DLDs are not exempt from Title 27 and are governed by Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities.
3. **Corrective Action Program (CAP).** During the 1990's the groundwater beneath the DLDs were found to be impacted by elevated concentrations of nitrates, chlorides and total dissolved solids (TDS). To mitigate the impacted groundwater, the Class III landfill that took grit and screenings was closed and the DLDs were either lined or closed. The District implemented a Corrective Action Program in December 1995 to remediate the impacted groundwater and it consisted of extraction wells down gradient of the DLDs. The extraction wells keep the groundwater from migrating off the Facility site. The groundwater is discharged to the secondary clarifiers of the WWTP where it continues through the remaining treatment processes and discharged to the Sacramento River. The CAP is operational and is regulated under Order No. R5-2003-0076, Sacramento Regional County Sanitation District Biosolids and Solids Storage and Disposal Facilities
4. **Emergency Storage Basins (ESBs).** The Facility includes five Emergency Storage Basins (ESBs), ESB-A through E with a total capacity of 302 million gallons (MG). ESB-A is lined with concrete and has 15.5 MG of capacity. The purpose of ESB-A is to store diverted influent flows above the SRWTP hydraulic capacity (peak wet weather flows) and store diverted effluent flows to meet various conditions to comply with the NPDES permit. Reasons to divert final effluent to ESB-A and not discharge to the Sacramento River include maintaining the minimum 14:1 river to effluent ratio, maintaining effluent temperature requirements, and maintaining chlorine limits. Flow

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stored in ESB-A is returned to the SRWTP headworks for treatment. Overflow from ESB-A discharges to unlined ESB-B that can if necessary overflow to unlined ESB-C. The combined capacity of ESB-B and C is 206 MG. Since construction of ESB-D, ESB-A is typically only used to store excess influent flows. ESB-A, B and C are exempt from Title 27, § 20090(a) since these basins are integral to protecting the SRWTP treatment processes from washing out due to peak wet weather flows or for storage of diverted flow to comply NPDES permit conditions.

ESB-D is lined with 60-mil reinforced polypropylene liner and has a capacity of 60-75 MG. The primary use of ESB-D is to stored diverted chlorinated effluent to comply with flow dilution, potential chlorine excursions and thermal requirements. Chlorinated effluent from ESB-D is returned to the SRWTP for dechlorination prior to discharge to the Sacramento River. Since ESB-D is lined there is minimal threat to groundwater and is consistent with water quality objectives and therefore is exempt from Title 27 § 20090(a).

ESB-E is part of the surge relief mechanism and designed to relief waterhammer effects in the influent conduit. ESB-E stores raw influent in an unlined earthen 20 MG basin and is exempt from Title 27 § 20090(a).

#### IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

Effluent limitations and toxic and pretreatment effluent standards established pursuant to sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the CWA and amendments thereto are applicable to the discharge.

The CWA mandates the implementation of effluent limitations that are as stringent as necessary to meet water quality standards established pursuant to state or federal law [33 U.S.C., §1311(b)(1)(C); 40 CFR 122.44(d)(1)]. NPDES permits must incorporate discharge limits necessary to ensure that water quality standards are met. This requirement applies to narrative criteria as well as to criteria specifying maximum amounts of particular pollutants. Pursuant to federal regulations, 40 CFR 122.44(d)(1)(i), NPDES permits must contain limits that control all pollutants that *“are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality.”* Federal regulations, 40 CFR 122.44(d)(1)(vi), further provide that *“[w]here a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits.”*

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: 40 CFR 122.44(a) requires that permits include

applicable technology-based limitations and standards; and 40 CFR 122.44(d) requires that permits include WQBELs to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water where numeric water quality objectives have not been established. The Basin Plan at page IV-17.00, contains an implementation policy, “*Policy for Application of Water Quality Objectives*”, that specifies that the Regional Water Board “*will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.*” This Policy complies with 40 CFR 122.44(d)(1). With respect to narrative objectives, the Regional Water Board must establish effluent limitations using one or more of three specified sources, including: (1) USEPA’s published water quality criteria, (2) a proposed state criterion (i.e., water quality objective) or an explicit state policy interpreting its narrative water quality criteria (i.e., the Regional Water Board’s “*Policy for Application of Water Quality Objectives*”)(40 CFR 122.44(d)(1)(vi)(A), (B) or (C)), or (3) an indicator parameter.

The Basin Plan includes numeric site-specific water quality objectives and narrative objectives for toxicity, chemical constituents, discoloration, radionuclides, and tastes and odors. The narrative toxicity objective states: “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at III-8.00.) The Basin Plan states that material and relevant information, including numeric criteria, and recommendations from other agencies and scientific literature will be utilized in evaluating compliance with the narrative toxicity objective. The narrative chemical constituents objective states that waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses. At minimum, “*...water designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs)*” in Title 22 of CCR. The Basin Plan further states that, to protect all beneficial uses, the Regional Water Board may apply limits more stringent than MCLs. The narrative tastes and odors objective states: “*Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.*”

## **A. Discharge Prohibitions**

1. As stated in section I.G of Attachment D, Standard Provisions, this Order prohibits bypass from any portion of the treatment facility. Federal regulations, 40 CFR 122.41(m), define “bypass” as the intentional diversion of waste streams from any portion of a treatment facility. This section of the federal regulations, 40 CFR 122.41(m)(4), prohibits bypass unless it is unavoidable to prevent loss of life, personal injury, or severe property damage. In considering the Regional Water Board’s prohibition of bypasses, the State Water Board adopted a precedential decision, Order No. WQO 2002-0015, which cites the federal regulations, 40 CFR 122.41(m), as allowing bypass only for essential maintenance to assure efficient operation.
2. Order No. 5-00-118 included the discharge prohibition of no discharge unless the river is flowing more than 1300 cfs and there is at least a 14 to 1 flow ratio

(river:effluent). These conditions were based on previous studies that determined river flows of at least 1300 cfs and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow adequate mixing of the effluent. Although the diffuser configuration has changed from 99 ports to 74 ports and new dye studies confirmed the dynamic modeling showing mixing zones, all the recent analysis for the antidegradation, thermal plumes, dilution credits have been based on continuing these conditions. Therefore, these conditions remain in this Order.

## **B. Technology-Based Effluent Limitations**

### **Scope and Authority**

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order must meet minimum federal technology-based requirements based on Secondary Treatment Standards at 40 CFR Part 133.

Regulations promulgated in 40 CFR 125.3(a)(1) require technology-based effluent limitations for municipal Dischargers to be placed in NPDES permits based on Secondary Treatment Standards or Equivalent to Secondary Treatment Standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) established the minimum performance requirements for POTWs [defined in section 304(d)(1)]. Section 301(b)(1)(B) of that Act requires that such treatment works must, as a minimum, meet effluent limitations based on secondary treatment as defined by the USEPA Administrator.

Based on this statutory requirement, USEPA developed secondary treatment regulations, which are specified in 40 CFR Part 133. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of 5-day biochemical oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), and pH.

### **Applicable Technology-Based Effluent Limitations**

- a. BOD<sub>5</sub> and TSS.** Federal regulations, 40 CFR Part 133, establish the minimum weekly and monthly average level of effluent quality attainable by secondary treatment for BOD<sub>5</sub> and TSS. However, as described in section IV.C.3.c.xi, this Order requires water quality-based effluent limitations (WQBELs) more stringent than the applicable technology-based effluent limitations which are based on tertiary treatment, which is necessary to protect the beneficial uses of the receiving stream. Effluent limitations prescribed by this Order are equal to or are more stringent than the Technology-Based Effluent Limits for BOD<sub>5</sub>, TSS and pH. In addition, 40 CFR 133.102, in describing the minimum level of effluent quality attainable by secondary treatment, states that the 30-day average percent removal shall not be less than 85 percent. This Order contains a limitation

requiring an average of 85 percent removal of BOD<sub>5</sub> and TSS over each calendar month.

- b. Flow.** The Facility was designed to provide a secondary level of treatment for up to a design flow of 181 mgd. Therefore, this Order contains an average dry weather discharge flow effluent limit of 181 mgd.
- c. pH.** The secondary treatment regulations at 40 CFR Part 133 also require that pH be maintained between 6.0 and 9.0 standard units.

### Summary of Technology-based Effluent Limitations Discharge Point No. 001

**Table F-4. Summary of Technology-based Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD 5-day @ 20°C	mg/L	30	45	60	--	--
Total Suspended Solids	mg/L	30	45	60	--	--
pH	Standard Units	--	--	--	6.0	9.0
85% Removal of BOD 5-day @ 20°C and Total Suspended Solids						

## C. Water Quality-Based Effluent Limitations (WQBELs)

### 1. Scope and Authority

Section 301(b) of the CWA and 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards. The rationale for these requirements, which consist of tertiary treatment or equivalent requirements and other provisions, is discussed in section IV.C.3 of this Fact Sheet

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the

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state's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

## 2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, the Basin Plan implements State Water Board Resolution No. 88-63, which established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

The Basin Plan on page II-1.00 states: "*Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...*" and with respect to disposal of wastewaters states that "*...disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.*"

The federal CWA section 101(a)(2), states: "*it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983.*" Federal Regulations, developed to implement the requirements of the CWA, create a rebuttable presumption that all waters be designated as fishable and swimmable. Federal Regulations, 40 CFR sections 131.2 and 131.10, require that all waters of the State regulated to protect the beneficial uses of public water supply, protection and propagation of fish, shell fish and wildlife, recreation in and on the water, agricultural, industrial and other purposes including navigation. Section 131.3(e), 40 CFR, defines existing beneficial uses as those uses actually attained after 28 November 1975, whether or not they are included in the water quality standards. Federal Regulation, 40 CFR section 131.10 requires that uses be obtained by implementing effluent limitations, requires that all downstream uses be protected and states that in no case shall a state adopt waste transport or waste assimilation as a beneficial use for any waters of the United States.

- a. Receiving Water and Beneficial Uses.** Beneficial uses applicable to Sacramento-San Joaquin Delta are as follows:

**Table F-5. Basin Plan Beneficial Uses**

Discharge Point	Receiving Water Name	Beneficial Use(s)
001	<b>Sacramento – San Joaquin Delta</b>	Existing: Municipal and domestic supply (MUN); Agricultural supply, including irrigation and stock watering (AGR); Industrial process supply (PROC); Industrial service supply (IND); Water contact recreation, including canoeing and rafting (REC-1); Non-contact water recreation (REC-2); Warm freshwater habitat (WARM); Cold freshwater habitat (COLD); Migration of aquatic organisms, warm and cold (MIGR); Spawning, reproduction, and/or early development, warm (SPWN); Wildlife habitat (WILD); and Navigation (NAV).
NA	<b>Groundwater</b>	Municipal and domestic water supply (MUN); Agricultural supply (AGR); Industrial service supply (IND), and Industrial process supply (PRO).

The Delta is vital to California and comprises over 700 miles of interconnected waterways and encompasses 1,153 square miles. The Delta is home to over two hundred eighty species of birds and more than fifty species of fish, making it one of the most ecologically important aquatic habitats in the State. Drinking water for over 25 million Californians is pumped from the Delta via the State Water Project, Central Valley Water Project, and local water intakes. The Delta supports California's trillion dollar economy with \$27 billion annually for agriculture. Additionally, the Delta has 12 million user-days for recreation each year.

- b. Effluent and Ambient Background Data.** The reasonable potential analysis (RPA), as described in section IV.C.3 of this Fact Sheet, was based on effluent data from 1 June 2005 through 30 July 2008 effluent and ambient background data from 1 January 1998 through 30 July 2008 submitted in SMRs, the Report of Waste Discharge (ROWD), the Pretreatment Program Annual Reports and the Coordinated Monitoring Program. Additional data outside of this range was also analyzed where there was inadequate data to perform an analysis. Effluent and ambient data for iron and manganese was collected in 2009 because this data was not included in the other databases described above. The Discharger collected effluent and receiving water dioxin and furan data in 2002 and 2004 and are included under a technical memorandum SRWTP 13267 Dioxin Data.

### c. Priority Pollutant Metals

- i. **Hardness Dependent CTR Metals Criteria.** The *California Toxics Rule* and the *National Toxics Rule* contain water quality criteria for seven metals that vary as a function of hardness. The lower the hardness the lower the water quality criteria. The metals with hardness-dependent criteria include cadmium, copper, chromium III, lead, nickel, silver, and zinc.

This Order has established the criteria for hardness-dependent metals based on the reasonable worst-case ambient hardness as required by the SIP<sup>1</sup>, the CTR<sup>2</sup> and State Water Board Order No. WQO 2008-0008 (City of Davis). The SIP and the CTR require the use of “receiving water” or “actual ambient” hardness, respectively, to determine effluent limitations for these metals. (SIP, § 1.2; 40 CFR § 131.38(c)(4), Table 4, note 4.) The CTR does not define whether the term “ambient,” as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions. Therefore, where reliable, representative data are available, the hardness value for calculating criteria can be the downstream receiving water hardness, after mixing with the effluent (Order WQO 2008-0008, p. 11). The Central Valley Water Board thus has considerable discretion in determining ambient hardness (*Id.*, p.10.).

The hardness values must also be protective under all flow conditions (*Id.*, pp. 10-11). As discussed below, scientific literature provides a reliable method for calculating protective hardness-dependent CTR criteria, considering all discharge conditions. This methodology produces criteria that ensure these metals do not cause receiving water toxicity, while avoiding criteria that are unnecessarily stringent.

- (a) **Reasonable Potential Analysis (RPA).** The SIP in Section 1.3 states, “The RWQCB shall...determine whether a discharge may: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable priority pollutant criterion or objective.” Section 1.3 provides a step-by-step procedure for conducting the RPA. The procedure requires the comparison of the Maximum Effluent Concentration (MEC) and Maximum Ambient Background Concentration to the applicable criterion that has been properly adjusted for hardness. Unless otherwise noted, for the hardness-dependent CTR metals criteria the following procedures were followed for properly adjusting the criterion for hardness when conducting the RPA.

<sup>1</sup> The SIP does not address how to determine the hardness for application to the equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states, in Section 1.2, that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.

<sup>2</sup> The CTR requires that, for waters with a hardness of 400 mg/L (as CaCO<sub>3</sub>), or less, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.

- For comparing the MEC to the applicable criterion, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case downstream hardness was used to adjust the criterion. In this evaluation the portion of the receiving water affected by the discharge is analyzed. For hardness-dependent criteria, the hardness of the effluent has an impact on the determination of the applicable criterion in areas in the receiving water affected by the discharge. Therefore, for this situation it is necessary to consider the hardness of the effluent in determining the applicable hardness to adjust the criterion. The procedures for determining the applicable criterion after proper adjustment using the reasonable worst-case downstream hardness is outlined in subsection ii, below.
- For comparing the Maximum Ambient Background Concentration to the applicable criterion, in accordance with the SIP, CTR, and Order WQO 2008-0008, the reasonable worst-case upstream hardness was used to adjust the criterion. In this evaluation the area outside the influence of the discharge is analyzed. For this situation, the discharge does not impact the upstream hardness. Therefore, the effect of the effluent hardness was not included in this evaluation. Upstream receiving water hardness data for the Sacramento River ranged from 26 mg/L to 100 mg/L (as CaCO<sub>3</sub>), based on 100 samples from June 2005 to July 2008. The minimum observed upstream receiving water hardness, 26 mg/L as CaCO<sub>3</sub>, was used to adjust the CTR criteria when comparing Maximum Background Ambient Concentration to the criterion.

**(b) Effluent Concentration Allowances (ECA) Calculations.** A 2006 Study<sup>1</sup> developed procedures for calculating the effluent concentration allowance (ECA)<sup>2</sup> for CTR hardness-dependent metals. The 2006 Study demonstrated that it is necessary to evaluate all discharge conditions (e.g. high and low flow conditions) and the hardness and metals concentrations of the effluent and receiving water when determining the appropriate ECA for these hardness-dependent metals. Simply using the lowest recorded upstream receiving water hardness to calculate the ECA may result in over or under protective water quality-based effluent limitations.

The equation describing the total recoverable regulatory criterion, as established in the CTR, is as follows:

<sup>1</sup> Emerick, R.W.; Borroum, Y.; & Pedri, J.E., 2006. California and National Toxics Rule Implementation and Development of Protective Hardness Based Metal Effluent Limitations. WEFTEC, Chicago, Ill.

<sup>2</sup> The ECA is defined in Appendix 1 of the SIP (page Appendix 1-2). The ECA is used to calculate water quality-based effluent limitations in accordance with Section 1.4 of the SIP.

$$\text{CTR Criterion} = \text{WER} \times (e^{m[\ln(H)]+b}) \text{ (Equation 1)}$$

Where:

H = hardness (as  $\text{CaCO}_3$ )

WER = water-effect ratio

m, b = metal- and criterion-specific constants

In accordance with the CTR, the default value for the WER is 1. A WER study must be conducted to use a value other than 1. The constants “m” and “b” are specific to both the metal under consideration, and the type of total recoverable criterion (i.e., acute or chronic). The metal-specific values for these constants are provided in the CTR at paragraph (b)(2), Table 1.

The equation for the ECA is defined in Section 1.4, Step 2, of the SIP and is as follows:

$$\text{ECA} = C \text{ (when } C \leq B)^1 \text{ (Equation 2)}$$

Where

C = the priority pollutant criterion/objective, adjusted for hardness (see Equation 1, above)

B = the ambient background concentration

The 2006 Study demonstrated that the relationship between hardness and the calculated criteria is the same for some metals, so the same procedure for calculating the ECA may be used for these metals. The same procedure can be used for chronic cadmium, chromium III, copper, nickel, and zinc. These metals are hereinafter referred to as “Concave Down Metals”. “Concave Down” refers to the shape of the curve represented by the relationship between hardness and the CTR criteria in Equation 1. Another similar procedure can be used for determining the ECA for acute cadmium, lead, and acute silver, which are referred to hereafter as “Concave Up Metals”.

**ECA for Concave Down Metals** – For Concave Down Metals (i.e., chronic cadmium, chromium III, copper, nickel, and zinc) the 2006 Study demonstrates that when the effluent is in compliance with the CTR criteria and the upstream receiving water is in compliance with the CTR criteria, any mixture of the effluent and receiving water will always be in compliance with the CTR criteria. Therefore, based on any observed ambient background hardness, no receiving water assimilative capacity for metals (i.e., ambient background metals concentrations are at their

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<sup>1</sup> The 2006 Study assumes the ambient background metals concentration is equal to the CTR criterion (i.e.  $C \leq B$ )

respective CTR criterion) and the minimum effluent hardness, the ECA calculated using Equation 1 with a hardness equivalent to the minimum effluent hardness is protective under all discharge conditions (i.e., high and low dilution conditions and under all mixtures of effluent and receiving water as the effluent mixes with the receiving water). This is applicable whether the effluent hardness is less than or greater than the ambient background receiving water hardness.

The effluent hardness ranged from 80 mg/L to 150 mg/L (as CaCO<sub>3</sub>), based on 216 samples from June 2005 to July 2008. The upstream receiving water hardness varied from 26 mg/L to 100 mg/L (as CaCO<sub>3</sub>), based on 100 samples from June 2005 to July 2008. Using a hardness of 80 mg/L (as CaCO<sub>3</sub>) to calculate the ECA for all Concave Down Metals will result in water quality-based effluent limitations that are protective under all potential effluent/receiving water mixing scenarios and under all known hardness conditions, as demonstrated in the example using copper shown in Table F-6, below. This example assumes the following conservative conditions for the upstream receiving water:

- Upstream receiving water always at the lowest observed upstream receiving water hardness (i.e., 26 mg/L as CaCO<sub>3</sub>).
- Upstream receiving water copper concentration always at the CTR criteria (i.e., no assimilative capacity). Based on available data, the receiving water never exceeded the CTR criteria for any metal with hardness-dependent criteria.

As demonstrated in Table F-6, using a hardness of 80 mg/L (as CaCO<sub>3</sub>) for to calculate the ECA for Concave Down Metals ensures the discharge is protective under all discharge and mixing conditions. In this example, the effluent is in compliance with the CTR criteria and any mixture of the effluent and receiving water is in compliance with the CTR criteria. An ECA based on a lower hardness (e.g. lowest upstream receiving water hardness) would also be protective, but would result in unreasonably stringent effluent limits considering the known conditions. Therefore, in this Order the ECA for all Concave Down Metals has been calculated using Equation 1 with a hardness of 80 mg/L (as CaCO<sub>3</sub>).

**Table F-6. Copper ECA Evaluation**

Minimum Observed Effluent Hardness		80 mg/L (as CaCO <sub>3</sub> )		
Minimum Observed Upstream Receiving Water Hardness		26 mg/L (as CaCO <sub>3</sub> )		
Maximum Assumed Dissolved Upstream Receiving Water Copper Concentration		3.0 µg/L <sup>1</sup>		
Dissolved Copper ECA <sub>chronic</sub> <sup>2</sup>		7.7 µg/L		
Effluent Fraction	Mixed Downstream Ambient Concentration			
	Hardness <sup>3</sup> (mg/L) (as CaCO <sub>3</sub> )	CTR Criteria <sup>4</sup> (µg/L)	Copper <sup>5</sup> (µg/L)	
	1%	26.5	3.0	3.0
	5%	28.7	3.2	3.2
	15%	34.1	3.7	3.7
	25%	39.5	4.2	4.1
	50%	53	5.4	5.3
	75%	66.5	6.6	6.5
	100%	80	7.7	7.7

<sup>1</sup> Maximum assumed upstream receiving water dissolved copper concentration calculated using Equation 1 for chronic criterion at a hardness of 26 mg/L (as CaCO<sub>3</sub>).

<sup>2</sup> Dissolved ECA calculated using Equation 1 for chronic criterion at a hardness of 80 mg/L (as CaCO<sub>3</sub>).

<sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

<sup>4</sup> Mixed downstream ambient criteria (as dissolved) are the chronic criteria calculated using Equation 1 at the mixed hardness.

<sup>5</sup> Mixed downstream ambient copper concentration (dissolved) is the mixture of the receiving water and effluent dissolved copper concentrations at the applicable effluent fraction.

**ECA for Concave Up Metals** - For Concave Up Metals (i.e., acute cadmium, lead, and acute silver), the 2006 Study demonstrates that due to a different relationship between hardness and the metals criteria, the effluent and upstream receiving water can be in compliance with the CTR criteria, but the resulting mixture may be out of compliance. Therefore, the 2006 Study provides a mathematical approach to calculate the ECA to ensure that any mixture of effluent and receiving water is in compliance with the CTR criteria (see Equation 3, below). The ECA, as calculated using Equation 3, is based on the reasonable worst-case ambient background hardness, no receiving water assimilative capacity for metals (i.e., ambient background metals concentrations are at their respective CTR criterion), and the minimum observed effluent hardness. The reasonable worst-case ambient background hardness depends on whether the effluent hardness is greater than or less than the upstream receiving water hardness. There are circumstances where the conservative ambient background hardness assumption is to assume that the upstream receiving water is at the highest observed hardness

concentration. The conservative upstream receiving water condition as used in the Equation 3 below is defined by the term  $H_{rw}$ .

$$ECA_i = \left( \frac{m(H_e - H_{rw})(e^{m\{\ln(H_{rw})\}+b}}{H_{rw}} \right) + e^{m\{\ln(H_{rw})\}+b} \quad \text{(Equation 3)}$$

$m, b$  = criterion specific constants (from CTR)san jose

$H_e$  = minimum observed effluent hardness

$H_{rw}$  = minimum observed upstream receiving water hardness when the minimum effluent hardness is always greater than observed upstream receiving water hardness ( $H_{rw} < H_e$ )

-or-

maximum observed upstream receiving water hardness when the minimum effluent hardness is always less than observed upstream receiving water hardness ( $H_{rw} > H_e$ )<sup>1</sup>

A similar example as was done for the Concave Down Metals is shown for lead, a Concave Up Metal, in Tables F-6 and F-7, below. As previously mentioned, the minimum effluent hardness is 80 mg/L (as  $\text{CaCO}_3$ ), while the upstream receiving water hardness ranged from 26 mg/L to 100 mg/L (as  $\text{CaCO}_3$ ), based on 100 samples from June 2005 to July 2008. In this case, the minimum effluent concentration is within the range of observed upstream receiving water hardness concentrations. Therefore, Equation 3 was used to calculate two ECAs, one based on the minimum observed upstream receiving water hardness and one based on the maximum observed upstream receiving water hardness. Using Equation 3, the lowest ECA results from using the minimum upstream receiving water hardness, the minimum effluent hardness, and assuming no receiving water assimilative capacity for lead (i.e., ambient background lead concentration is at the CTR chronic criterion).

<sup>1</sup> When the minimum effluent hardness falls within the range of observed receiving water hardness concentrations, Equation 3 is used to calculate two ECAs, one based on the minimum observed upstream receiving water hardness and one based on the maximum observed upstream receiving water hardness. The minimum of the two calculated ECAs represents the ECA that ensures any mixture of effluent and receiving water is in compliance with the CTR criteria.



**Table F-7. Lead ECA Evaluation Using Minimum Receiving Water Hardness**

Minimum Observed Effluent Hardness		80 mg/L (as CaCO <sub>3</sub> )		
Minimum Observed Upstream Receiving Water Hardness		26 mg/L (as CaCO <sub>3</sub> )		
Maximum Assumed Upstream Receiving Water Lead Concentration		0.57 µg/L <sup>1</sup>		
Lead ECA <sub>acute</sub> <sup>2</sup>		2.1 µg/L		
Effluent Fraction	Mixed Downstream Ambient Concentration			
	Hardness <sup>3</sup> (mg/L) (as CaCO <sub>3</sub> )	CTR Criteria <sup>4</sup> (µg/L)	Lead <sup>5</sup> (µg/L)	
	1%	26.5	0.6	0.6
	5%	28.7	0.6	0.6
	15%	34.1	0.8	0.8
	25%	39.5	1.0	1.0
	50%	53.0	1.4	1.3
	75%	66.5	1.9	1.7
	100%	80.0	2.4	2.1

<sup>1</sup> Maximum assumed upstream receiving water lead concentration calculated using Equation 1 for acute criterion at a hardness of 26 mg/L (as CaCO<sub>3</sub>).

<sup>2</sup> ECA calculated using Equation 3 for chronic criteria.

<sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

<sup>4</sup> Mixed downstream ambient criteria and the chronic criteria calculated using Equation 1 at the mixed hardness.

<sup>5</sup> Mixed downstream ambient lead concentration is the mixture of the receiving water and effluent lead concentrations at the applicable effluent fraction.

**Table F-8. Lead ECA Evaluation Using Maximum Receiving Water Hardness**

Minimum Observed Effluent Hardness			80 mg/L (as CaCO <sub>3</sub> )	
Maximum Observed Upstream Receiving Water Hardness			100 mg/L (as CaCO <sub>3</sub> )	
Maximum Assumed Upstream Receiving Water Lead Concentration			3.2 µg/L <sup>1</sup>	
Lead ECA <sub>acute</sub> <sup>2</sup>			2.4 µg/L	
Effluent Fraction	Mixed Downstream Ambient Concentration			
	Hardness <sup>3</sup> (mg/L) (as CaCO <sub>3</sub> )	CTR Criteria <sup>4</sup> (µg/L)	Lead <sup>5</sup> (µg/L)	
	1%	99.8	3.2	3.2
	5%	99.0	3.1	3.1
	15%	97.0	3.1	3.1
	25%	95.0	3.0	3.0
	50%	90.0	2.8	2.8
	75%	85.0	2.6	2.6
	100%	80.0	2.4	2.4

<sup>1</sup> Maximum assumed upstream receiving water lead concentration calculated using Equation 1 for chronic criterion at a hardness of 100 mg/L (as CaCO<sub>3</sub>).

<sup>2</sup> ECA calculated using Equation 3 for chronic criteria.

<sup>3</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness at the applicable effluent fraction.

<sup>4</sup> Mixed downstream ambient criteria and the acute criteria calculated using Equation 1 at the mixed hardness.

<sup>5</sup> Mixed downstream ambient lead concentration is the mixture of the receiving water and effluent lead concentrations at the applicable effluent fraction.

Using Equation 3 to calculate the ECA for all Concave Up Metals will result in water quality-based effluent limitations that are protective under all potential effluent/receiving water mixing scenarios and under all known hardness conditions, as demonstrated in Tables F-6 and F-7, for lead. In this example, the effluent is in compliance with the CTR criteria and any mixture of the effluent and receiving water is in compliance with the CTR criteria. Use of a lower ECA (e.g., calculated based solely on the lowest upstream receiving water hardness) is also protective, but would lead to unreasonably stringent effluent limits considering the known conditions. Therefore, Equation 3 has been used to calculate the ECA for all Concave Up Metals in this Order.

Table F-9 summarizes the ECAs calculated for all hardness-dependant metals.

**Table F-9. Summary of ECA Evaluations**

Metals	Effluent Concentration Allowances, ECAs (ug/L) as total recoverable metals	
	acute	chronic
Copper	11	7.7
Chromium III	1500	72
Cadmium	3.3	2.1
Lead	54	2.1
Nickel	390	43
Silver	1.8	--
Zinc	99	99

ii. **Conversion Factors.** The CTR contains aquatic life criteria for arsenic, cadmium, chromium III, chromium VI, copper, lead, nickel, silver, and zinc which are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentrations to total concentrations. The default USEPA conversion factors contained in Appendix 3 of the SIP were used to convert the applicable dissolved criteria to total recoverable criteria.

d. **Dilution Credits/Mixing Zones.** The SRCSD has requested mixing zones and dilution credits for compliance with acute and chronic aquatic life water quality criteria, and human carcinogen water quality criteria. The Central Valley Water Board has the discretion to accept or deny mixing zones and dilution credits. The CWA directs states to adopt water quality standards to protect the quality of its waters. USEPA's current water quality standards regulation authorizes states to adopt general policies, such as mixing zones, to implement state water quality standards (40 CFR section 122.44 and section 122.45). The USEPA allows states to have broad flexibility in designing its mixing zone policies. Primary policy and guidance on determining mixing zone and dilution credits is provided by the SIP and the Basin Plan. If no procedure applies in the SIP or the Basin Plan, then the Central Valley Water Board may use the USEPA Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) (TSD).

The TSD defines a mixing zone as follows, "...a mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented."<sup>1</sup> The SIP provides guidance on mixing zones and dilution credits in establishing water quality-based effluent limitations. Water quality criteria and objectives must be met throughout a water body except within

<sup>1</sup> TSD, Glossary, pg. xx

a mixing zone. All mixing zones shall be as small as practicable and must meet specific conditions. The allowance of mixing zones by the Central Valley Water Board is discretionary and can be granted parameter-by-parameter and/or type of criteria (e.g., acute or chronic aquatic life criteria).

The allowance of mixing zones by the Central Valley Water Board is discussed in the Basin Plan, Policy for Application of Water Quality Objectives, which states in part, *"In conjunction with the issuance of NPDES and storm water permits, the Regional Board may designate mixing zones within which water quality objectives will not apply provided the discharger has demonstrated to the satisfaction of the Regional Board that the mixing zone will not adversely impact beneficial uses. If allowed, different mixing zones may be designated for different types of objectives, including, but not limited to, acute aquatic life objectives, chronic aquatic life objectives, human health objectives, and acute and chronic whole effluent toxicity objectives, depending in part on the averaging period over which the objectives apply. In determining the size of such mixing zones, the Regional Board will consider the applicable procedures and guidelines in the EPA's Water Quality Standards Handbook and the [TSD]. Pursuant to EPA guidelines, mixing zones designated for acute aquatic life objectives will generally be limited to a small zone of initial dilution in the immediate vicinity of the discharge."*<sup>1</sup>

Section 1.4.2 of the SIP states, in part, *"...with the exception of effluent limitations derived from TMDLs, in establishing and determining compliance with effluent limitations for applicable human health, acute aquatic life, or chronic aquatic life priority pollutant criteria/objectives or the toxicity objective for aquatic life protection in a basin plan, the Regional Board may grant mixing zones and dilution credits to dischargers ... The applicable priority pollutant criteria and objectives are to be met throughout a water body except within any mixing zone granted by the Regional Board. The allowance of mixing zones is discretionary and shall be determined on a discharge-by-discharge basis. The Regional Board may consider allowing mixing zones and dilution credits only for discharges with a physically identifiable point of discharge that is regulated through an NPDES permit issued by the Regional Board."*<sup>2</sup>

Both federal and state guidance include similar mixing zone conditions, the SIP conditions are as follows:

*"A mixing zone shall be as small as practicable. The following conditions must be met in allowing a mixing zone:*

*A: A mixing zone shall not:*

- 1. compromise the integrity of the entire water body;*

<sup>1</sup> Basin Plan, page IV-16.00

<sup>2</sup> SIP, pg. 15

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2. *cause acutely toxic conditions to aquatic life passing through the mixing zone;*
3. *restrict the passage of aquatic life;*
4. *adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws;*
5. *produce undesirable or nuisance aquatic life;*
6. *result in floating debris, oil, or scum;*
7. *produce objectionable color, odor, taste, or turbidity;*
8. *cause objectionable bottom deposits;*
9. *cause nuisance;*
10. *dominate the receiving water body or overlap a mixing zone from different outfalls; or*
11. *be allowed at or near any drinking water intake. A mixing zone is not a source of drinking water. To the extent of any conflict between this determination and the Sources of Drinking Water Policy (Resolution No. 88-63), this SIP supersedes the provisions of that policy.”<sup>1</sup>*

The mixing zone is thus an administrative construct defined as an area around the outfall that may exceed water quality objectives, but is otherwise protective of the beneficial uses. Dilution is defined as the amount of mixing that has occurred at the edge of this mixing zone under critical conditions, thus protecting the beneficial uses at the concentration and for the duration and frequency required.

- i. **Sacramento River Hydrology.** The lower Sacramento River in the vicinity of the discharge is a large river with sufficient flows for dilution. The Sacramento watershed is a heavily managed system of reservoirs and diversions. The Sacramento River near the discharge location (Freeport) drains a 26,146-square-mile basin that spans the entire northern Central Valley of California from the crest of the Coast Range to the crest of the Sierra Nevada. Flows in the Sacramento River are influenced by precipitation (rainfall and snowpack/snowmelt), but are also influenced by several reservoirs on the tributaries and main stem, which are managed for flood control, water supply, and hydroelectric power generation. Irrigation diversions and agricultural return flows also affect the river regime. Winter

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<sup>1</sup> SIP, pg. 17

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and spring flows in the Sacramento River often exceed 50,000 cfs. While summer flows average 10,000 cfs, they can fall below 4,000 cfs. Daily flow probabilities for the Sacramento River at Freeport, based on U.S. Geologic Survey gauged flow data from 1942-1989, indicate that there is only a 10% probability of flows less than or equal to 10,000 cfs, and a 10% probability of flows greater than 70,000 cfs. Therefore, typical flows in the Sacramento range from 10,000 to 70,000 cfs. The critical low flows for the Sacramento River based on flow data at Freeport from 1970 to 2009 are shown in Table F-10, below.

**Table F-10. Critical Receiving Water Flows**

Critical Low Flows	Receiving Water Flow (cfs)
1Q10 <sup>1</sup>	5060
7Q10 <sup>2</sup>	5846
30Q5	8234
Harmonic Mean	15733

<sup>1</sup> Lowest daily average flow with a return frequency of 10 years.

<sup>2</sup> Lowest 7-day average flow with a return frequency of 10 years.

- ii. **Water Quality Models.** For completely-mixed discharges, the Central Valley Water Board may grant a mixing zone and apply a dilution credit in accordance with Section 1.4.2.1 of the SIP, based on the dilution ratio. For incompletely-mixed discharges, the Discharger must perform a mixing zone study to demonstrate to the Central Valley Water Board that a dilution credit is appropriate. The SRWTP discharge is considered an incompletely-mixed discharge, so the Discharger conducted a mixing zone study. A mathematical dynamic model was developed by Flow Sciences Inc. and consists of five models linked in series, with the output from previous models used as part of the inputs to subsequent models. The models are linked as shown in Figure F-1 and are described below.

**PROSIM – U.S. Bureau of Reclamation’s Project Simulation Model.** PROSIM simulates the existing hydrologic conditions in the Delta study area and was used to calculate the 70-year period of record (1922-1991) that served as the basis for the SRCSD study. Flow and storage calculated by PROSIM was used as input to the Temperature Models. Also, output from PROSIM were used as input to the Fischer Delta Model (FDM) and includes: export pumping rates from Tracy and Banks; Contra Costa Water District pumping at Rock Slough and Old River; North Bay Aqueduct pumping; City of Vallejo pumping; net Delta consumptive use; Delta Cross Channel position; and Delta inflows from Yolo Bypass, San Joaquin River, Calaveras River, Cosumnes River, Mokelumne River, and Sacramento River.

**Temperature Models – U.S. Bureau of Reclamation models.** The Bureau of Reclamation has developed temperature models for five reservoirs (Trinity,

Whiskeytown, Shasta, Oroville, and Folsom) and three river systems (Sacramento, Feather, and American). These models estimate mean monthly water temperatures based on flow and storage quantities calculated by PROSIM.

*FDM – Fischer Delta Model.* The Fischer Delta Model was used to support both the near-field and far-field modeling. For the near-field region, FDM was used to disaggregate hourly flow rates for the Sacramento River at Freeport from the 70-year record of monthly flows calculated by PROSIM. The hourly flow data were then used as input to the 3-D near-field model (FLOWMOD) as well as the Longitudinal Dispersion model. For the far-field region, FDM was used to simulate the contribution of SRWTP discharges to water quality concentrations at various critical locations in the Delta

*FLOWMOD – Flow Science’s computational fluid dynamics model.* The near-field modeling was accomplished with the 3-dimensional FLOWMOD computational fluid dynamics model developed by Flow Science. FLOWMOD was used to calculate the steady-state concentration of effluent in each grid cell of the model domain for specific combinations of river and effluent flow rates. A horizontal grid resolution of 6 feet was defined from the diffuser to a point 300 feet downstream of the diffuser. The grid resolution increased geometrically from 300 feet to 700 feet downstream of the diffuser. Results from the model defined the average effluent concentration in the area of impact (i.e., within the 200:1 dilution contour) downstream of the diffuser. SRCSD is using this model to separately evaluate the thermal characteristics of the discharge plume.

*LD – Flow Science’s Longitudinal Dispersion Model.* The LD model was developed by Flow Science and the computer code is written in the Matlab programming language for implementation on an IBM-PC compatible microcomputer. This 1-dimensional model simulates the advection and dispersion of effluent discharged to the Sacramento River including reverse tidal flow conditions. The LD model is used to estimate the concentration in the near-field vicinity of the diffuser following the start of a diversion event in which the effluent discharge is diverted to storage when the Sacramento River flow rate falls below the minimum required 14:1 dilution ratio<sup>1</sup>.

The results from the LD model are combined with the results from the FLOWMOD model (by method of superposition) to estimate the concentrations of the effluent in the near-field zone that result from “double dosing” during the flow reversal events. The length of the LD model domain is 53,000 feet (about 10 miles) and includes the diffuser. The model domain

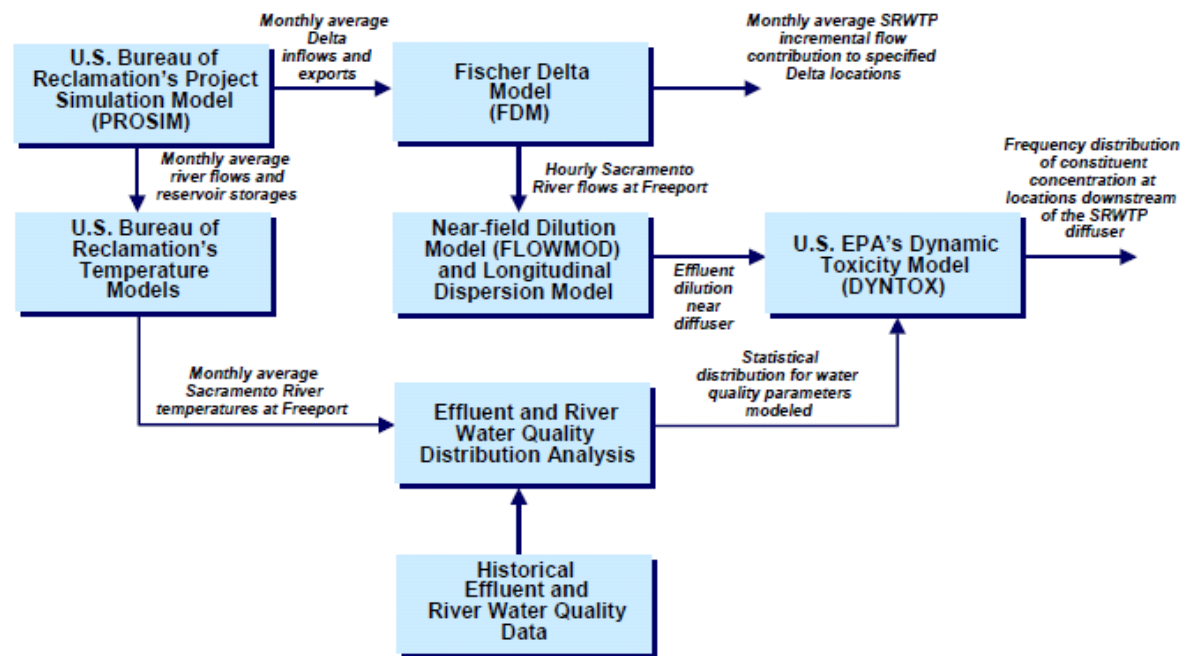
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<sup>1</sup> The Discharger is prohibited from discharging when the dilution ratio (river:effluent) is less than 14:1 or if river flows are less than 1300 cfs and diverts all effluent discharge to emergency storage basins. These requirements ensure the diffuser is operating as designed and limits double-dosing of the discharge during flow reversals.

is represented by 530 discrete spatial intervals, each 100 feet long. Calculations are made at a 400-second time step.

**DYNTOX – U.S. EPA’s Dynamic Toxicity Model.** DYNTOX was developed in 1985 with funding support provided by EPA. The model is designed for waste load allocations of toxic substances. DYNTOX contains three procedures to define the frequency and duration of exposure above a specific water quality criterion: (1) continuous simulation, (2) Monte Carlo simulation, and (3) log normal analysis. The continuous simulation procedure with randomly generated water quality distributions was used for the SRWTP study. Hourly values for the 70-year simulation period resulted in over 600,000 data points that were representative of the statistical concentration distribution at 6 key locations downstream of the diffuser.

**Figure F-1: Dynamic Model Flow Diagram**



In the period from 2005 through 2007, the Discharger performed several field validation studies to corroborate the effectiveness of the modeling tools in representing water quality conditions in the Sacramento River. Due to the complexity of the mathematical models, in 2006 the Central Valley Water Board used the services of Tetra Tech, a USEPA contractor, to assist with the review of the dynamic model. Tetra Tech’s modeling experts concluded that the model study was conducted in a sound and scientifically defensible manner. The modeling experts determined that the linked dynamic modeling system is capable of providing an accurate probabilistic representation of receiving water quality conditions. The only perceived short coming noted by



the model experts from a regulatory perspective was the complexity of the system of linked models and the proprietary status of some of the model components preventing its transmittal and direct use by Central Valley Water Board staff. The results of Tetra Tech's review are summarized in a Tetra Tech memorandum dated 30 June 2008.

**iii. Evaluation of Available Dilution for Acute Aquatic Life Criteria.** USEPA Region VIII, in its "EPA Region VIII Mixing Zones and Dilution Policy", recommends no dilution for acute aquatic life criteria, stating the following, "*In incomplete mix situations, discharge limitations to implement acute chemical-specific aquatic life criteria and narrative (no acute toxicity) criteria shall be based on achieving such acute criteria at the end-of-pipe (i.e., without an allowance for dilution). This approach is intended to implement the narrative requirement prohibiting acutely toxic conditions in the mixing zone.*"<sup>1</sup> The SRCSD has requested an acute mixing zone for compliance with acute water quality criteria for ammonia, copper, cyanide, and chlorpyrifos. However, as discussed in subsection vi, below, an acute mixing zone is either not needed or not acceptable to ensure protection of the beneficial uses of the receiving water. Therefore, an acute mixing zone is not allowed in this Order. See subsection vi, below, for a pollutant-by-pollutant evaluation for these constituents.

**iv. Evaluation of Available Dilution for Chronic Aquatic Life Criteria.** The chronic aquatic life mixing zone is sized to protect the water body as a whole and is generally larger than the acute mixing zone. A mixing zone for chronic aquatic life criteria has been allowed in this Order for development of the WQBELs for cyanide and chlorpyrifos.

The chronic aquatic life mixing zone is 400 feet wide and extends 350 feet downstream of the diffuser. The chronic mixing zone meets the requirements of the SIP as follows:

(1) Shall not compromise the integrity of the entire waterbody - The TSD states that, "*If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats.*"<sup>2</sup> The Sacramento River is approximately 600 feet wide at the surface. The chronic mixing zone is approximately 400 ft x 350 ft. The Sacramento River is a very large waterbody. The chronic mixing zone would not compromise the integrity of the entire waterbody.

<sup>1</sup> USEPA Region VIII Mixing Zones and Dilution Policy, December 1994 (Updated September 1995), (page 18)

<sup>2</sup> TSD, pg. 33

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(2) *Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone* – The chronic mixing zone does not allow acute aquatic life criteria to be exceeded and this Order requires acute bioassays to be conducted using 100% effluent. Compliance with these requirements ensures that acutely toxic conditions to aquatic life passing through the chronic mixing zone do not occur.

(3) *Shall not restrict the passage of aquatic life* – The SRCSD developed a dynamic model to evaluate the near-field effects of the discharge. The dynamic model was used to evaluate the zone of passage around the mixing zone where water quality objectives are met. The dynamic model indicates there is a zone of passage for aquatic life, which was verified through dye testing. The size of the zone of passage varies on either side of the river depending on the river geometry<sup>1</sup>. The surface of the river is approximately 600 feet across and the bottom of the river is approximately 400 feet across. Based on the model the zone of passage at the surface of the river is generally at least 100 feet on both sides of the river, while the zone of passage at the bottom of the river is greater than 40 feet from both sides of the river.

(4) *Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws* – The chronic mixing zone will not cause acutely toxic conditions, allows adequate zones of passage, and is sized appropriately to ensure that there will be no adverse impacts to biologically sensitive or critical habitats.

(5) *Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance* – This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration and the removal of ammonia. With these requirements the chronic mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(6) *Shall not dominate the receiving water body or overlap a mixing zone from different outfalls* – The chronic mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

(7) *Shall not be allowed at or near any drinking water intake* – The chronic mixing zone is not near a drinking water intake. The nearest downstream

<sup>1</sup> Model Verification Results for FLOWMOD Simulations of SRCSD Effluent Discharge to the Sacramento River at Freeport, November 2007 Field Study, Flow Science

drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The chronic aquatic life mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same guidelines.

- v. Evaluation of Available Dilution for Human Health Criteria.** The Discharger's dynamic model is useful in determining the mixing and dilution near the discharge (i.e., near-field) and the model domain extends 700 feet downstream. Human health-based criteria are generally based long-term exposures, such as safe levels for lifetime exposure (e.g., for carcinogens, consumption of 1 liter/day for 70 years) and the mixing zones typically extend beyond the near-field mixing estimated by the Discharger's dynamic model. Since the human health mixing zone extends beyond the model domain of the dynamic model, the Discharger conducted a study titled "Sacramento River Harmonic Mean Mixing Zone Report" (June 2010) to establish the human health mixing zone and dilution. The June 2010 study identified the point downstream of the discharge where complete mixing occurs. Based on the results of the June 2010 study, the discharge is completely mixed approximately 3 miles downstream. The Discharger has requested the human health mixing zone extend to this point.

In determining the available receiving water dilution for compliance with human carcinogen criteria, the SIP, section 1.4.2.1 requires that the harmonic mean of the receiving water flow be compared against the arithmetic mean of the effluent flow of the observed discharge period. Based on Sacramento River flow data at Freeport from 1 January 1970 to 31 December 2009 the harmonic mean river flow is 15,733 cfs. The permitted average dry weather flow for the Facility is 181 mgd (280 cfs). Therefore, a dilution ratio of 56:1 is available for compliance with human carcinogen criteria. This Order allows a dilution credit for human carcinogen criteria of 56:1 and the mixing zone extends 3 miles downstream of the discharge. For non-human carcinogen human health criteria, the TSD recommends dilution based on a 30Q5 receiving water flow<sup>1</sup>, which is the lowest 30 day average flow with a recurrence frequency of once in five years. Based on Sacramento River flow data at Freeport from 1 January 1970 to 31 December 2009 the 30Q5 flow is 8234 cfs, resulting in a dilution credit of 29:1.

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<sup>1</sup> USEPA Water Quality Handbook, Section 5.2

The human health mixing zone meets the requirements of the SIP as follows:

(1) Shall not compromise the integrity of the entire waterbody - The TSD states that, *"If the total area affected by elevated concentrations within all mixing zones combined is small compared to the total area of a waterbody (such as a river segment), then mixing zones are likely to have little effect on the integrity of the waterbody as a whole, provided that the mixing zone does not impinge on unique or critical habitats."*<sup>1</sup> The Sacramento River is a very large waterbody and the human health mixing zone is not applicable to aquatic life criteria. Therefore, the human health mixing zone does not compromise the integrity of the entire waterbody.

(2) Shall not cause acutely toxic conditions to aquatic life passing through the mixing zone –The human health mixing zone is not applicable to aquatic life criteria. Therefore, acutely toxic conditions will not occur in the mixing zone.

(3) Shall not restrict the passage of aquatic life – The human health mixing zone is not applicable to aquatic life criteria. Therefore, the mixing zone will not restrict the passage of aquatic life.

(4) Shall not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws – The human health mixing zone is not applicable to aquatic life criteria. Therefore, the mixing zone will not impact biologically sensitive or critical habitats.

(5) Shall not produce undesirable or nuisance aquatic life; result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; cause nuisance – This Order requires the discharge meets Title 22 (or equivalent) tertiary filtration and the removal of ammonia. With these requirements the human health mixing zone will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum; produce objectionable color, odor, taste, or turbidity; cause objectionable bottom deposits; or cause nuisance.

(6) Shall not dominate the receiving water body or overlap a mixing zone from different outfalls – The human health mixing zone is small relative to the water body, so it will not dominate the water body. Furthermore, the mixing zone does not overlap mixing zones from other outfalls. There are no outfalls or mixing zones in the vicinity of the discharge.

(7) Shall not be allowed at or near any drinking water intake – There are no drinking water intakes within the human health mixing zone. The nearest drinking water intake is the Freeport Regional Water Authority intake one mile upstream of the discharge at Freeport, which is owned and operated by East

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<sup>1</sup> TSD, pg. 33

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Bay Municipal Utility District (EBMUD). An operating agreement between the EBMUD and the Discharger dated 2006 will prevent diversion of river water containing diluted treated wastewater at the Freeport water intake. The nearest downstream drinking water intake is the Barker Slough Pumping Plant, which is approximately 40 miles downstream of the discharge.

The human health mixing zone therefore complies with the SIP. The mixing zone also complies with the Basin Plan, which requires that the mixing zone not adversely impact beneficial uses. Beneficial uses will not be adversely affected for the same reasons discussed above. In determining the size of the mixing zone, the Central Valley Water Board considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same guidelines.

**vi. Evaluation of Available Dilution for Specific Constituents (Pollutant-by-Pollutant Evaluation).** When determining to allow dilution credits for a specific pollutant several factors must be considered, such as, available assimilative capacity, facility performance, and best practicable treatment or control. In this subsection a pollutant-by-pollutant evaluation of dilution is discussed. The SRCSD requested acute and chronic aquatic life dilution credits for ammonia, copper, cyanide, and chlorpyrifos. Human carcinogen dilution credits were requested for carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl)phthalate, dibenzo(ah)anthracene, 1,2-diphenyl-hydrazine, and N-nitrosodimethylamine. Additionally, human health dilution credits were requested for manganese, nitrate, and MTBE. A pollutant-by-pollutant evaluation is discussed below.

**Ammonia** – Acute and chronic aquatic life dilution credits for ammonia have not been granted. This Order requires full nitrification for removal of ammonia. See Section IV.C.3 of the Fact Sheet for a detailed discussion.

**Copper** – Assimilative capacity is available for copper in the receiving water. However, based on facility performance, dilution credits for copper are not needed, therefore, dilution credits have not been allowed for copper. Table F-11, below, shows the WQBELs calculated using SRCSD's dynamic model with the allowance of acute and chronic aquatic life dilution, end-of-pipe effluent limitations using a reasonable worst-case steady-state approach, and the Facility's performance. This information demonstrates the Facility can meet end-of-pipe effluent limitations, therefore, no dilution credits have been allowed for copper.

**Table F-11. WQBELs for Copper**

	Average Monthly Effluent Limitation	Maximum Daily Effluent Limitation
Dynamic Modeling	7.7 µg/L	9.8 µg/L
Steady-State Approach	7.3 µg/L	9.3 µg/L
Facility Performance <sup>1</sup>	6.8 µg/L	

<sup>1</sup> Projected 99.9<sup>th</sup> percentile of effluent copper data from June 2005-October 2009

**Cyanide** – Table F-12, below, shows the WQBELs for cyanide calculated using SRCSD’s dynamic model with the allowance of acute and chronic aquatic life dilution, WQBELs calculated using SRCSD’s dynamic model with the allowance of only chronic aquatic life dilution, end-of-pipe effluent limitations using a reasonable worst-case steady-state approach, and the Facility’s performance. This information demonstrates the Facility cannot meet end-of-pipe effluent limits, but can meet WQBELs calculated with the allowance of chronic aquatic life dilution. Acute aquatic life dilution is not needed for cyanide. Assimilative capacity is available for cyanide in the receiving water, and, as discussed above, the chronic aquatic life mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for cyanide have been developed considering the allowance of chronic aquatic life dilution.

**Table F-12. WQBELs for Cyanide**

	Average Monthly Effluent Limitation	Maximum Daily Effluent Limitation
Dynamic Modeling (acute and chronic dilution)	21 µg/L	40 µg/L
Dynamic Modeling (chronic dilution only)	11 µg/L	22 µg/L
Steady-State Approach	4.3 µg/L	8.3 µg/L
Facility Performance <sup>1</sup>	11 µg/L	

<sup>1</sup> Projected 99.9<sup>th</sup> percentile of effluent copper data from June 2005-October 2009

**Chlorpyrifos** – Table F-13, below, shows the WQBELs for chlorpyrifos calculated using SRCSD’s dynamic model with the allowance of acute and chronic aquatic life dilution, WQBELs calculated using SRCSD’s dynamic model with the allowance of only chronic aquatic life dilution, end-of-pipe effluent limitations using a reasonable worst-case steady-state approach, and the Facility’s performance. This information indicates that the Facility cannot meet end-of-pipe effluent limits. Although there appears to be assimilative

capacity in the vicinity of the discharge, the Sacramento-San Joaquin Delta is impaired for chlorpyrifos. Allowing dilution credits allows lower levels of treatment and control of the discharge and a higher mass loading of chlorpyrifos. Since the Delta is impaired for chlorpyrifos, no dilution credits have been allowed in this Order.

**Table F-13. WQBELs for Chlorpyrifos**

	Average Monthly Effluent Limitation	Maximum Daily Effluent Limitation
Dynamic Modeling (acute and chronic dilution)	29 ng/L	59 ng/L
Dynamic Modeling (chronic dilution only)	12 ng/L	25 ng/L
Steady-State Approach	12 ng/L	25 ng/L
Facility Performance <sup>1</sup>	120 ng/L	

<sup>1</sup> Projected 99.9<sup>th</sup> percentile of effluent chlorpyrifos data from June 2005- October 2009

**Aluminum**– Based on existing effluent data from June 2005 – October 2009, the Facility can meet end-of-pipe effluent limitations for aluminum of 200 µg/L annual average. Therefore, a dilution credit has not been allowed. Additionally, there is no assimilative capacity in the receiving water. The Sacramento River maximum aluminum concentrations are over 8000 µg/L. The Discharger collected 61 samples during this time period resulting in samples ranging from 12 to 35.2 µg/L. The effluent sampling was part of the three times per year sampling required in the previous permit, which required daily sampling for one week three times per year. The discharge never exceeded the new AMEL or MDEL.

**Carbon tetrachloride** - Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for carbon tetrachloride of 0.25 µg/L and 0.50 µg/L, as an average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL), respectively. The Discharger collected 101 samples during this time period resulting in 95 non-detect samples (i.e., ranging from <0.06 µg/L to <0.5 µg/L), three J-flagged estimates of 0.1 µg/L, 0.1 µg/L, and 0.2 µg/L, and three samples above the reporting level at 0.5 µg/L, 1.4 µg/L, and 1.7 µg/L. The effluent sampling was part of the three times per year sampling required in the previous permit, which required daily sampling for one week three times per year. Assimilative capacity is available for carbon tetrachloride in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs

for carbon tetrachloride have been developed considering the allowance of human carcinogen dilution credits.

**Chlorodibromomethane** – Based on existing effluent data from June 2005 – October 2009, the Facility cannot meet end-of-pipe effluent limitations for chlorodibromomethane of 0.41 µg/L and 0.82 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for chlorodibromomethane in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for chlorodibromomethane have been developed considering the allowance of human carcinogen dilution credits.

**Dichlorobromomethane** – Based on existing effluent data from June 2005– October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for dichlorobromomethane of 0.56 µg/L and 1.1 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for dichlorobromomethane in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for dichlorobromomethane have been developed considering the allowance of human carcinogen dilution credits.

**Methylene chloride** – Based on existing effluent data from June 2005– October 2009, the Facility cannot meet end-of-pipe effluent limitations for methylene chloride of 4.7 µg/L and 11 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for methylene chloride in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for methylene chloride have been developed considering the allowance of human carcinogen dilution credits.

**Tetrachloroethylene** – Based on existing effluent data from June 2005– October 2009, the Facility cannot meet end-of-pipe effluent limitations for tetrachloroethylene of 0.8 µg/L and 1.6 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for tetrachloroethylene in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for tetrachloroethylene have been developed considering the allowance of human carcinogen dilution credits.

**Pentachlorophenol** – Based on existing effluent data from June 2005– October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for pentachlorophenol of 0.28 µg/L and 0.56 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for pentachlorophenol in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for pentachlorophenol have been developed considering the allowance of human carcinogen dilution credits.



**Bis(2-ethylhexyl)phthalate** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for bis(2-ethylhexyl)phthalate of 1.8 µg/L and 3.4 µg/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for bis(2-ethylhexyl)phthalate in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for bis(2-ethylhexyl)phthalate have been developed considering the allowance of human carcinogen dilution credits.

**Dibenzo(ah)anthracene** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for dibenzo(ah)anthracene of 4 ng/L and 9 ng/L, as an AMEL and MDEL, respectively. Assimilative capacity is available for dibenzo(ah)anthracene in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for dibenzo(ah)anthracene have been developed considering the allowance of human carcinogen dilution credits.

**1,2-diphenyl-hydrazine** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for 1,2-diphenyl-hydrazine of 0.04 µg/L and 0.08 µg/L, as an AMEL and MDEL, respectively. Although 1,2-diphenyl-hydrazine was not detected in the receiving water, the detection level for 1,2-diphenyl-hydrazine is greater than the water quality criterion. Therefore, there is no assimilative capacity and dilution credits are not allowed for development of the WQBELs for 1,2-diphenyl-hydrazine.

**N-nitrosodimethylamine** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet end-of-pipe effluent limitations for N-nitrosodimethylamine of 0.69 ng/L and 1.38 ng/L, as an AMEL and MDEL, respectively. The receiving water showed no detectable concentrations for NDMA out of 47 samples, but the detection levels are too high to detect low concentrations. Thus, no assimilative capacity is available for N-nitrosodimethylamine in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, no dilution credits have been allowed to develop the WQBELs for N-nitrosodimethylamine.

**Manganese** – Based on existing effluent data from April 2009-June 2009, it appears that the Facility cannot meet an end-of-pipe AMEL for manganese of 50 µg/L. The Discharger collected 34 samples during this time period and the maximum effluent concentration was 82 µg/L and averaged 64 µg/L. Assimilative capacity is available for manganese in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for manganese have

been developed considering the allowance of non-human carcinogen dilution credits.

**Nitrate** – Human health dilution credits for nitrate have not been granted. This Order requires full denitrification for removal of nitrate. See Section IV.C.3 of the Fact Sheet for a detailed discussion.

**MTBE** – Based on existing effluent data from June 2005- October 2009, it appears that the Facility cannot meet an end-of-pipe annual average effluent limitation for MTBE of 5 µg/L. Assimilative capacity is available for MTBE in the receiving water, and, as discussed above, the human health mixing zone meets the requirements of the SIP and Basin Plan. Therefore, the WQBELs for MTBE have been developed considering the allowance of non-human carcinogen dilution credits.

### 3. Determining the Need for WQBELs

- a. Unless otherwise stated, the Central Valley Water Board conducted the RPA in accordance with section 1.3 of the SIP. Although the SIP applies directly to the control of CTR priority pollutants, the State Water Board has held that the Central Valley Water Board may use the SIP as guidance for water quality-based toxics control.<sup>1</sup> The SIP states in the introduction *“The goal of this Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency.”* Therefore, unless otherwise stated, in this Order the RPA procedures from the SIP were used to evaluate reasonable potential for both CTR and non-CTR constituents based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs.
- b. **Constituents with Limited Data.** Reasonable potential cannot be determined for the following constituents because effluent data are limited or ambient background concentrations are not available. The Discharger is required to continue to monitor for these constituents in the effluent using analytical methods that provide the best feasible detection limits. When additional data become available, further analysis will be conducted to determine whether to add numeric effluent limitations or to continue monitoring.
  - i. **2,3,7,8-TCDD and TCDD-Equivalents.** The CTR includes a criterion for 2,3,7,8-TCDD of 0.013 pg/l for the protection of human health based on consumption of water and organisms and 0.014 pg/L for ingestion of organisms only. The CTR does not include criteria for other dioxin congeners and there are no formally promulgated numeric water quality criteria for the other dioxin congeners. Therefore, determination of reasonable potential and effluent limitations, when appropriate, would be based on an interpretation of

<sup>1</sup> See Order WQO 2001-16 (Napa) and Order WQO 2004-0013 (Yuba City).

the Basin Plan narrative toxicity standard. The SIP does not explicitly direct the Regional Water Boards to establish effluent limits when dioxin congeners are detected in the effluent. Rather it directs the discharger to report the data and in its report to multiply each measured or estimated congener concentration by its respective toxic equivalency factors (TEF) value and report the sum of these values to the Regional Boards.

2,3,7,8-TCDD was not detected in any of the samples collected in the Facility effluent or in the receiving water. The MEC for TCDD-equivalents was 26.0 µg/L. In the effluent two of the congeners, OCDD and 1,2,3,6,7,8-HpCDD were reported as detected. The maximum observed upstream receiving water TCDD-equivalents concentration was 28.0 The CTR includes a criterion for 2,3,7,8-TCDD of 0.013 pg/L for the protection of human health based on consumption of water and organisms and 0.014 pg/L for ingestion of organisms only. The CTR does not include criteria for other dioxin congeners and there are no formally promulgated numeric water quality criteria for the other dioxin congeners. Therefore, determination of reasonable potential and effluent limitations, when appropriate, would be based on an interpretation of the Basin Plan narrative toxicity standard. In the receiving water, two of the congeners OCDD and 1,2,3,6,7,8-HpCDD were reported as detected.

Based on the limited data provided, the Central Valley Water Board is unable to determine if the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for TCDD-equivalents. WQBELs for TCDD-equivalents are not included in this Order due to the fact that 1) only TCDD-equivalents were detected in the effluent and receiving water and not TCDD and, 2) the Sacramento-San Joaquin Delta is not listed as impaired for dioxins and furans.

Due to the concerns of the potential impacts of dioxins and furans on the receiving water, this Order will require consecutive three times annually monitoring of all 2,3,7,8 TCDD congeners. If monitoring data indicates the potential for exceedance of applicable criteria, then the Central Valley Water Board will reopen the Order and establish applicable WQBELs for TCDD-equivalents. This Order also requires the Discharger to implement measures to evaluate and reduce detected dioxins OCDD and 1,2,3,6,7,8-HpCDD in its discharge to the receiving water. The Special Provision in section VI.C.3.<X> of this Order requires the Discharger to prepare a 2,3,7,8-TCCD congeners source evaluation and minimization plan. Implementation measures to reduce detectable amounts of cogeners may include source control and other effective means. Compliance with these requirements should result in the reduction of detectable amounts of TCDD-equivalents in the effluent discharged to the receiving water.

- ii. **Perchlorate.** The primary MCL for perchlorate is 6 µg/L. As part of the pretreatment monitoring program the Discharger began monitoring for perchlorate in February 2000. The MEC for perchlorate is 600 µg/L and was

detected 14 out of 81 samples. All R-1 samples showed no detection for perchlorate. The analytical test method used was EPA 300.0 followed by EPA 314 starting in October 2008. Neither EPA 300.0 or 314 are recommended for wastewater analyses, instead these tests are used for surface and ground water. Both these tests can be influenced by salts and give false positive readings. Starting in February 2009, any detection of perchlorate by EPA 314 is further confirmed with EPA 331. Since initiating the confirmation testing with EPA 331, no perchlorate has been detected in the effluent. The Reporting and Monitoring Program requires perchlorate be sampled three times per year with analytical method SW-846 Method 6850 which is specific to analyzing wastewater effluents. If monitoring indicates exceedance of applicable criteria, then the Central Valley Water Board will reopen the Order and will establish applicable WQBELs for perchlorate.

- c. **Constituents with No Reasonable Potential.** WQBELs are not included in this Order for constituents that do not demonstrate reasonable potential; however, monitoring for those pollutants is established in this Order as required by the SIP. If the results of effluent monitoring demonstrate reasonable potential, this Order may be reopened and modified by adding an appropriate effluent limitation.

- i. **Diazinon.** The California Department of Fish and Game (DFG) established acute and chronic criteria for diazinon to protect fresh water aquatic life. The acute (1-hour average) and chronic (4-day average) criteria are 0.08 µg/L and 0.05 µg/L, respectively. These criteria are protective of the Basin Plan's narrative toxicity objective. The Central Valley Water Board recently completed a total maximum daily load (TMDL) for diazinon in the Sacramento and Feather Rivers and amended the Basin Plan to include diazinon waste load allocations and water quality objectives on 16 October 2003. The Basin Plan now contains water quality objectives for diazinon of 0.080 µg/L as a 1-hour average and 0.050 µg/L as a 4-day average for the Sacramento River from the Colusa Basin Drain to the I Street Bridge. The Basin Plan also states that "[c]ompliance with water quality objectives, waste load allocations, and load allocations for diazinon in the Sacramento and Feather Rivers is required by June 30, 2008" and "[t]he waste load allocations for all NPDES-permitted discharges are the diazinon water quality objectives."

The maximum effluent concentration (MEC) for diazinon was less than 0.05 µg/L (non-detect) while the maximum observed upstream receiving water concentration was 0.06 µg/L. Therefore, diazinon in the discharge has no reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

- ii. **Oil and Grease.** The Basin Plan contains a narrative oil and grease objective which states, "Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or

coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.”

Effluent oil and grease concentrations from June 2005 to July 2008 are always less than 6 mg/L. Therefore, oil and grease in the discharge has no reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

- iii. **Persistent Chlorinated Hydrocarbon Pesticides.** The Basin Plan requires that no individual pesticides shall be present in concentrations that adversely affect beneficial uses; discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses; persistent chlorinated hydrocarbon pesticides shall not be present in the water column at detectable concentrations; and pesticide concentrations shall not exceed those allowable by applicable antidegradation policies. Persistent chlorinated hydrocarbon pesticides include aldrin; alpha-BHC; beta-BHC; gamma-BHC (lindane); delta-BHC; chlordane; 4,4-DDT; 4,4-DDE; 4,4-DDD; dieldrin; alpha-endosulfan; beta-endosulfan; endosulfan sulfate; endrin; endrin aldehyde; heptachlor; heptachlor epoxide; and toxaphene.
- Aldrin; alpha-BHC; beta-BHC; gamma-BHC; delta-BHC; chlordane; 4,4-DDT; 4,4-DDE; 4,4-DDD; dieldrin; alpha-endosulfan; beta-endosulfan; endosulfan sulfate; endrin; endrin aldehyde; heptachlor; heptachlor epoxide; and toxaphene were not detected in the effluent in concentrations with detection levels ranging from as high as 0.04 µg/L to 0.002. There is no reasonable potential for these constituents to exceed the Basin Plan objectives for persistent chlorinated hydrocarbon pesticides.
- iii. **Salinity.** There are no USEPA water quality criteria for the protection of aquatic organisms for electrical conductivity, total dissolved solids, sulfate, and chloride. The Basin Plan contains a chemical constituent objective that incorporates state MCLs, contains a narrative objective, and contains numeric water quality objectives for electrical conductivity, total dissolved solids, sulfate, and chloride.

**Table F-14. Salinity Water Quality Criteria/Objectives**

Parameter	Agricultural WQ Goal <sup>1</sup>	Secondary MCL <sup>3</sup>	Average Ambient Background	Effluent	
				Average	Maximum
EC (µmhos/cm)	Varies <sup>2</sup>	900, 1600, 2200	163	764	960
TDS (mg/L)	Varies	500, 1000, 1500	98	410	540
Sulfate (mg/L)	Varies	250, 500, 600	--	90	110
Chloride (mg/L)	Varies	250, 500, 600	5.1	90	100

<sup>1</sup> Agricultural water quality goals based on *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985)

<sup>2</sup> The EC level in irrigation water that harms crop production depends on the crop type, soil type, irrigation methods, rainfall, and other factors. An EC level of 700 umhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities.

<sup>3</sup> The secondary MCLs are stated as a recommended level, upper level, and a short-term maximum level.

**Table F-15. Basin Plan Water Quality Objectives for EC  
Sacramento River at Emmaton, Based on Water Year Type  
(maximum 14-day running average of mean daily EC in µmhos/cm)**

Date	Water Year Type				
	Wet	Above Normal	Below Normal	Dry	Critical
1 April – 14 June	450	450	450	450	2780
15 June – 19 June	450	450	450	1670	2780
20 June – 30 June	450	450	1140	1670	2780
1 July - 15 August	450	630	1140	1670	2780

For priority pollutants, the SIP dictates the procedures for conducting the RPA. EC, TDS, chloride, and sulfate are not priority pollutants. Therefore, the Central Valley Water Board is not restricted to one particular RPA method. Due to the site-specific conditions of the discharge, the Central Valley Water Board has used best professional judgment in determining the appropriate method for conducting the RPA for these non-priority pollutant salinity constituents. For conducting the RPA, the USEPA recommends using a mass-balance approach to determine the expected critical downstream receiving water concentration using a steady-state approach<sup>1</sup>. This downstream receiving water concentration is then compared to the applicable water quality objectives to determine if the discharge has reasonable potential to cause or contribute to an in-stream excursion. This approach allows assimilative capacity and dilution to be factored into the RPA. This USEPA recommended approach has been used for these salinity constituents. The

<sup>1</sup> USEPA NPDES Permit Writers' Course (EPA 833-B-97-001 rev. October 2009)

critical downstream receiving water concentration is calculated using equation 2 below:

$$C_r = \frac{Q_s C_s + Q_d C_d}{Q_r} \quad (\text{Equation 2})$$

Where,

- $Q_s$  = Critical stream flow (30Q5) recommended by USEPA for non-carcinogen human health criteria.
- $Q_d$  = Critical effluent flow from discharge flow data (maximum permitted discharge)
- $Q_r$  = Sum of critical stream flow and critical effluent flow
- $C_s$  = Critical upstream pollutant concentration
- $C_d$  = Critical effluent pollutant concentration
- $C_r$  = Critical downstream receiving water pollutant concentration

The critical stream flow used in this evaluation for the salinity constituents is a 30Q5 flow of 8234 cubic feet per second (cfs). The critical stream flow was calculated based on USGS flow data for the Sacramento River at the Freeport Bridge for the period of 1970 – 2009.

The critical effluent flow,  $Q_d$ , is 181 million gallons per day (mgd) (i.e., 281 cfs), which is the maximum permitted flow allowed in this Order. The critical effluent pollutant concentration,  $C_d$ , was determined using statistics recommended in the TSD for statistically calculating the projected maximum effluent concentration (MEC) (i.e., Table 3-1 of the TSD using the 99% probability basis and 99% confidence level).

**(a) Chloride.** Chloride concentrations in the effluent ranged from 76 mg/L to 100 mg/L, with an average of 91 mg/L. Background concentrations in Sacramento-San Joaquin Delta ranged from 2.1 mg/L to 11 mg/L, with an average of 5.2 mg/L, for 98 samples collected by the Discharger from 15 January 1998 through 12 June 2008. The effluent and receiving water chloride levels do not exceed the agricultural water goal. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for chloride.

**(b) Electrical Conductivity.** A review of the Discharger's monitoring reports shows an average effluent EC of 764  $\mu\text{mhos/cm}$ , with a range from 369  $\mu\text{mhos/cm}$  to 960  $\mu\text{mhos/cm}$ . The projected maximum effluent concentration, calculated as discussed above, is 972  $\mu\text{mhos/cm}$ . The maximum background receiving water concentration was 260  $\mu\text{mhos/cm}$ ,

and averaged 160  $\mu\text{mhos/cm}$ , based on 72 samples collected from November 2000 to July 2008. The maximum instream EC concentration is 283  $\mu\text{mhos/cm}$ , using Equation 2, above. The maximum instream EC concentration is less than all applicable water quality objectives for EC. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for EC.

**(c) Sulfate.** Sulfate concentrations in the effluent ranged from 50 mg/L to 110 mg/L, with an average of 90 mg/L. Background concentrations in the Sacramento-San Joaquin Delta were not monitored. However, based on the low chloride, electrical conductivity, the sulfate concentrations are probably also low. There is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for sulfate.

**(d) Total Dissolved Solids.** The average TDS effluent concentration was 410 mg/L with concentrations ranging from 200 mg/L to 540 mg/L. The projected maximum effluent concentration, calculated as discussed above, is 547 mg/L. The background receiving water TDS ranged from 35 mg/L to 180 mg/L, with an average of 98 mg/L. The maximum instream TDS concentration is 192 mg/L, using Equation 2, above. The maximum instream TDS concentration is less than all applicable water quality objectives for TDS. Therefore, there is no reasonable potential for the discharge to cause or contribute to an instream excursion of the applicable water quality objectives for TDS.

Based on the relatively low reported salinity, the discharge does not have reasonable potential to cause or contribute to an in-stream excursion of water quality objectives for salinity. However, since the discharge is to the Sacramento-San Joaquin Delta, an additional concern is the salt contribution to Delta waters. Allowing the Discharger to increase its current salt loading may be contrary to the Region-wide effort to address salinity in the Central Valley. Therefore, this Order includes a performance-based effluent limitation of 840  $\mu\text{mhos/cm}$  for EC to be applied as an annual average to limit the discharge to current levels. This performance-based effluent limitation was calculated as the 99.9<sup>th</sup> percentile of the running annual average effluent EC based on effluent data from June 2006 through April 2010.

In order to ensure that the Discharger will continue to control the discharge of salinity, this Order includes a requirement to develop and implement a salinity evaluation and minimization plan. Also water supply monitoring is required to evaluate the relative contribution of salt from the source water to the effluent.



iv. **Lead.**

(a) **WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for lead. The criteria for lead are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for lead were used for the discharge.

(b) **RPA Results.** For the effluent, the applicable lead chronic criterion (maximum 4-day average concentration) is 2.1 µg/L and the applicable acute criterion (maximum (1-hour concentration) is 54 µg/L, as total recoverable, (see Table F-9, above). The MEC for total lead was 1.19 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable lead chronic criterion is 0.57 µg/L and the applicable acute criterion is 15 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total lead concentration was 0.12 µg/L, based on data from 1992-2008. Based on this information, lead in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

v. **Silver.**

(a) **WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for silver. The criteria for silver are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for silver were used for the discharge.

(b) **RPA Results.** For the effluent, the applicable silver acute criterion (maximum (1-hour concentration) is 1.8 µg/L, as total recoverable, (see Table F-9, above). The MEC for total silver was 0.15 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable silver acute criterion is 0.4 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total silver concentration was 0.02 µg/L, based on data from 1992-2008. Based on this information, silver in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

vi. **Zinc.**

(a) **WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for zinc. The criteria for zinc are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for silver were used for the discharge.

(b) **RPA Results.** For the effluent, the applicable zinc chronic criterion (maximum 4-day average concentration) is 99 µg/L and the applicable acute criterion (maximum (1-hour concentration) is 99 µg/L, as total recoverable, (see Table F-9, above). The MEC for total zinc was 33.5 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable zinc acute and chronic criterion is 38 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total zinc concentration was 2.17 µg/L, based on data from 1992-2008. Based on this information, zinc in the discharge does not exhibit reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

d. **Constituents with Reasonable Potential.** The Central Valley Water Board finds that the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard for copper, mercury, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl)phthalate, dibenzo(ah)anthracene, 1,2-diphenyl-hydrazine, N-nitrosodimethylamine, aluminum, ammonia, nitrate, manganese, chlorpyrifos and MTBE. WQBELs for these constituents are included in this Order. A summary of the RPA is provided in Attachment G, and a detailed discussion of the RPA for each constituent is provided below.

i. **Aluminum**

(a) **WQO.** The Secondary MCL for aluminum for the protection of the MUN beneficial use is 200 µg/L. In addition, USEPA developed National Recommended Ambient Water Quality Criteria (NAWQC) for protection of freshwater aquatic life for aluminum. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for aluminum are 87 µg/L and 750 µg/L, respectively, for waters with a pH of 6.5 to 9.0. USEPA recommends that the ambient criteria are protective of the aquatic beneficial uses of receiving waters in lieu of site-specific criteria. However, information contained in the footnotes to the NAWQC indicate that the development of the chronic criterion was based on specific receiving water conditions where there is low pH (below 6.5) and low hardness levels (below 50 mg/L as CaCO<sub>3</sub>). The Sacramento River (SR)

has been measured to have hardness values—typically between 26 and 100 mg/L as  $\text{CaCO}_3$ . The SR has been measured above the discharge to have a pH between 6.4 to 8.8. Thus, it is unlikely that application of the chronic criterion of 87  $\mu\text{g/L}$  is necessary to protect aquatic life in the Sacramento River in the vicinity of the discharge. For similar reasons, the Utah Department of Environmental Quality (Department) only applies the 87  $\mu\text{g/L}$  chronic criterion for aluminum where the pH is less than 7.0 and the hardness is less than 50 mg/L as  $\text{CaCO}_3$  the receiving water after mixing. For conditions where the pH equals or exceeds 7.0 and the hardness is equal to or exceeds 50 mg/L as  $\text{CaCO}_3$ , the Department regulates aluminum based on the 750  $\mu\text{g/L}$  acute criterion. In this site-specific case it is likely that application of the stringent chronic criteria (87 $\mu\text{g/L}$ ) is overly protective.

- (b) RPA Results.** The maximum effluent concentration (MEC) for acid soluble aluminum was 35.2  $\mu\text{g/L}$  out of 61 samples while the maximum observed upstream receiving water total concentration was 8800  $\mu\text{g/L}$  out of 32 samples. Therefore, aluminum in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above both the NAWQA chronic water quality object and the secondary MCL.
- (c) WQBELs.** Due to no assimilative capacity, dilution credits are not allowed for development of the WQBELs for aluminum. This Order contains a final annual average effluent limitation for aluminum of 200  $\mu\text{g/L}$  based on the secondary MCL. In addition, an AMEL of 503  $\mu\text{g/L}$  and MDEL of 750  $\mu\text{g/L}$  has been applied based on USEPA's NAWQC for aluminum for protection of aquatic life.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 35.2  $\mu\text{g/L}$  is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

## ii. Ammonia

- (a) WQO.** The NAWQC for the protection of freshwater aquatic life for total ammonia, recommends acute (1-hour average; criteria maximum concentration or CMC) standards based on pH and chronic (30-day average; criteria continuous concentration or CCC) standards based on pH and temperature. USEPA also recommends that no 4-day average concentration should exceed 2.5 times the 30-day CCC. USEPA found that as pH increased, both the acute and chronic toxicity of ammonia increased. Salmonids were more sensitive to acute toxicity effects than other species. However, while the acute toxicity of ammonia was not influenced by temperature, it was found that invertebrates and young fish experienced increasing chronic toxicity effects with increasing temperature. Because the Sacramento-San Joaquin Delta has a

beneficial use of cold freshwater habitat and the presence of salmonids and early fish life stages in the Sacramento-San Joaquin Delta is well-documented, the recommended criteria for waters where salmonids and early life stages are present were used.

The maximum permitted effluent pH is 8.5, as the Basin Plan objective for pH in the receiving stream is the range of 6.5 to 8.5. In order to protect against the worst-case short-term exposure of an organism, a pH value of 8.5 was used to derive the acute criterion. The resulting acute criterion is 2.14 mg/L.

The maximum observed 30-day rolling average temperature and the maximum observed pH of the Sacramento River were used to calculate the 30-day CCC. The maximum observed 30-day average Sacramento River temperature was 72.5°F (22.5°C), for the rolling 30-day period ending 4 September 2001. The maximum observed Sacramento River pH value was 8.0 on 9 September 2000. Using a pH value of 8.0 and the worst-case temperature value of 72.5°F (22.5°C) on a rolling 30-day basis, the resulting 30-day CCC is 1.8 mg/L (as N). The 4-day average concentration is derived in accordance with the USEPA criterion as 2.5 times the 30-day CCC. Based on the 30-day CCC of 1.8 mg/L (as N), the 4-day average concentration that should not be exceeded is 4.5 mg/L (as N).

**(b) RPA Results.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. The Discharger does not currently use nitrification to remove ammonia from the waste stream. Ammonia is known to cause acute and/or chronic toxicity to aquatic organisms. Therefore, the discharge has reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective in the receiving water.

**(c) Dilution Considerations.** As discussed in Section IV.C.2.d of the Fact Sheet, an allowance for chronic aquatic life dilution may be granted. However, based on the considerations below and discussed in more detail in Attachment K, no dilution has been allowed for ammonia. The Central Valley Water Board determines that Discharger must fully nitrify and denitrify its wastewater to reduce ammonia and nitrogen for the following reasons:

- (1) Recent studies suggest that ammonia at ambient concentrations in the Sacramento River, Delta and Suisun Bay may be acutely toxic to native *Pseudodiaptomus forbesi* (copepod).

- (2) A consensus of scientific experts concluded the SRWTP is a major source of ammonia to the Delta<sup>1</sup>.
- (3) Recent studies provide evidence that ammonia from the SRWTP discharge is contributing to the inhibition nitrogen uptake by diatoms in Suisun Bay.
- (4) Ammonia along with the clam, *Corbula* and high turbidity are attributed to reducing diatom production and standing biomass in the Suisun Bay.
- (5) Downstream of the discharge point, ammonia may be a cause in the shift of the aquatic community from diatoms to smaller phytoplankton species that are less desirable as food species.
- (6) Regardless of whether ammonia is directly or indirectly contributing to the POD, ammonia is shown to affect adult *Pseudodiaptomus forbesi* reproduction at concentrations greater than or equal to 0.79 mg/L. And nauplii and juvenile *Pseudodiaptomus forbesi* are affected at ammonia concentrations greater to or equal 0.36 mg/L. These ammonia concentrations can be found downstream of the discharge. The beneficial use protection extends to all aquatic life and not limited to pelagic organisms.
- (7) USEPA expects to publish the 2009 Ammonia Criteria Update which includes more stringent ammonia criteria for freshwater mussels compared with criteria for salmonids in early 2011<sup>2</sup>. Freshwater mussels reside in the Upper Sacramento River above and likely below the SRWTP discharge.
- (8) The Discharger's effluent contains ammonia and BOD at levels that use all the assimilative capacity for oxygen demanding substances in the Sacramento-San Joaquin Delta. This results in no assimilative capacity for other cities and communities to discharge oxygen demanding constituents, which is needed for them to grow despite the fact that most of these cities and communities are already implementing Best Practical Treatment and Control (BPTC) at their own facilities and SRWTP is not.
- (9) The Discharger's effluent contains nitrosoamines at levels that are greater than 100 times the primary MCL. Nitrosamines are disinfection byproducts that are created when wastewater effluent contains

<sup>1</sup> Sommer, T., Cl Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K Souza. 2007. The Collapse of Pelagic Fishes in the Upper San Francisco Estuary. Fisheries 32(6):270-277.

<sup>2</sup> Personal Communication with Lisa Huff USEPA with Kathy Harder, August 2010.

ammonia and is then disinfected with chlorine, which is the case at the SRWTP.

- (10) The Discharger must fully comply with Resolution No. 68-16 that requires Best Practical Treatment and Control, which for this discharge includes nitrification and denitrification of their wastewater.

**(d) WQBELs.** The Central Valley Water Board calculates WQBELs in accordance with SIP procedures for non-CTR constituents, and ammonia is a non-CTR constituent. The SIP procedure assumes a 4-day averaging period for calculating the long-term average discharge condition (LTA). However, USEPA recommends modifying the procedure for calculating permit limits for ammonia using a 30-day averaging period for the calculation of the LTA corresponding to the 30-day CCC. Therefore, while the LTAs corresponding to the acute and 4-day chronic criteria were calculated according to SIP procedures, the LTA corresponding to the 30-day CCC was calculated assuming a 30-day averaging period. The lowest LTA representing the acute, 4-day CCC, and 30-day CCC is then selected for deriving the average monthly effluent limitation (AMEL) and the maximum daily effluent limitation (MDEL). The remainder of the WQBEL calculation for ammonia was performed according to the SIP procedures. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for ammonia of 1.8 µg/L and 2.2 µg/L, respectively, based on the NAWQC ammonia criteria for aquatic toxicity with no dilution credit.

**(e) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 45 mg/L is greater than the applicable WQBELs. See Table F-20. Performance-based Effluent Limitations Statistics. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is not feasible and appears to put the Discharger in immediate non-compliance with the ammonia final effluent limitations. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Discharger submitted an infeasibility analysis dated August 2010. As discussed in section IV.E of this Fact Sheet, a compliance schedule has been included in this Order for ammonia.

### iii. Bis(2-ethylhexyl) phthalate

- (a) **WQO.** The CTR includes a criterion of 1.8 µg/L for bis(2-ethylhexyl) phthalate for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for bis(2-ethylhexyl) phthalate was 8.1 µg/L out of 87 samples while the maximum observed upstream receiving water concentration was 0.58 µg/L out of 55 samples. Therefore, bis(2-ethylhexyl) phthalate in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** The receiving water contains assimilative capacity for bis(2-ethylhexyl) phthalate, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for bis(2-ethylhexyl) phthalate. Based on the allowable dilution credit, an AMEL of 94 µg/L and a MDEL of 180 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity of bis(2-ethylhexyl) phthalate and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (see See Table F-20. Performance-based Effluent Limitations Statistics.). This Order contains a final maximum daily effluent limitation (MDEL) for bis(2-ethylhexyl) phthalate of 13 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 8.1 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

### iv. Carbon Tetrachloride

- (a) **WQO.** The CTR includes a criterion of 0.25 µg/L for carbon tetrachloride for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The Discharger collected 101 samples during this time period resulting in 95 non-detect samples (i.e., ranging from <0.06 µg/L to <0.5 µg/L), three J-flagged estimates of 0.1 µg/L, 0.1 µg/L, and 0.2 µg/L, and three samples above the reporting level at 0.5 µg/L, 1.4 µg/L, and 1.7 µg/L. Therefore, carbon tetrachloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** The receiving water contains assimilative capacity for carbon tetrachloride, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for carbon tetrachloride. Based on the allowable dilution credit, an AMEL of 9 µg/L and a MDEL of 17 µg/L is

calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of carbon tetrachloride and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for carbon tetrachloride of 5.3 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 1.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### **v. Dibenzo(ah)anthracene**

- (a) WQO.** The CTR includes a criterion of 0.0044 µg/L for dibenzo(ah)anthracene for the protection of human health for waters from which both water and organisms are consumed.
- (b) RPA Results.** The maximum effluent concentration (MEC) for dibenzo(ah)anthracene was 0.51 µg/L with only one out of 117 samples showing detection while the maximum observed upstream receiving water concentration was 0.0026 µg/L with one detected sample and a J-flagged sample out of 23 samples showing detection. The detection levels varied from 0.001 to 10 µg/L. Therefore, dibenzo(ah)anthracene in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** Assimilative capacity within a water body is determined using detected and non-detected receiving water samples. Sampling for dibenzo(ah)anthracene was conducted between January 1998 to July 2008. Several analytical laboratory methods were used to detect dibenzo(ah)anthracene with MDLs varying from 10 µg/L to 0.00029 µg/L. To determine assimilative capacity the detected and non-detected sample concentrations are averaged and the averaged number is subtracted from the water quality criterion. If all the non-detected samples are used in determined assimilative capacity calculations then no assimilative capacity for dibenzo(ah)anthracene exists in the receiving water. However, this calculation may not provide an accurate assessment of assimilative capacity. Since October 2003 EPA method 625 with a MDL of 0.001 µg/L was used to determine if dibenzo(ah)anthracene was detected in the receiving water. One sample was detected with a J-flagged estimate of 0.0021 µg/L. Using 23 samples with EPA method 625 to determine assimilative capacity for dibenzo(ah)anthracene appears to be reasonable without using the samples with greater MDLs. The receiving water contains assimilative capacity for dibenzo(ah)anthracene, therefore, a dilution credit of 56:1 based on the harmonic mean of the river flow was



allowed in the development of the WQBELs for dibenzo(ah)anthracene. Based on the allowable dilution credit, an AMEL of 0.2 µg/L and a MDEL of 0.4 µg/L is calculated. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for dibenzo(ah)anthracene of 0.2 µg/L and 0.4 µg/L, respectively, based on the CTR criterion for the protection of human health.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.51 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for dibenzo(ah)anthracene are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the dibenzo(ah)anthracene effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### vi. Chlorodibromomethane

- (a) WQO.** The CTR includes a criterion of 0.41 µg/L for chlorodibromomethane for the protection of human health for waters from which both water and organisms are consumed.
- (b) RPA Results.** The maximum effluent concentration (MEC) for chlorodibromomethane was 0.7 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at a MDL of <0.18 µg/L. Therefore, chlorodibromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** The receiving water contains assimilative capacity for chlorodibromomethane, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for chlorodibromomethane. Based on the allowable dilution credit, an AMEL of 12 µg/L and a MDEL of 25 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of chlorodibromomethane and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent

Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for chlorodibromomethane of 2.2 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.7 µg/L is less than to the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible

#### vii. Dichlorobromomethane

- (a) WQO.** The CTR includes a criterion of 0.56 µg/L for dichlorobromomethane for the protection of human health for waters from which both water and organisms are consumed.
- (b) RPA Results.** The maximum effluent concentration (MEC) for dichlorobromomethane was 2.5 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at a MDL of <0.14 µg/L. Therefore, dichlorobromomethane in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) WQBELs.** The receiving water contains assimilative capacity for dichlorobromomethane, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for dichlorobromomethane. Based on the allowable dilution credit, an AMEL of 27 µg/L and a MDEL of 47 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of dichlorobromomethane and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). The performance-based effluent MDEL is 3.4 µg/L. Using the performance-based limit for the MDEL provides protection of the drinking water beneficial use and meets the antidegradation policy of no increase in concentration of dichlorobromomethane discharged by the Facility. This Order contains a final MDEL for dichlorobromomethane of 3.4 µg/L.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 2.5 µg/L is less than to the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible

#### viii. Methylene Chloride

- (a) WQO.** The CTR includes a criterion of 4.7 µg/L for methylene chloride for the protection of human health for waters from which both water and organisms are consumed.

- (b) **RPA Results.** The maximum effluent concentration (MEC) for methylene chloride was 5.4 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was not detected out of 44 samples at MDL of <0.35 µg/L. Therefore, methylene chloride in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** Although the receiving water contains assimilative capacity for methylene chloride, the Discharger can immediately comply with the applicable WQBELs without dilution. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for methylene chloride of 4.7 µg/L and 11 µg/L, respectively, based on the CTR criterion for the protection of human health.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the effluent never exceeded the WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### ix. N-nitrosodimethylamine

- (a) **WQO.** The CTR includes a criterion of 0.00069 µg/L for N-nitrosodimethylamine (NDMA) for the protection of human health for waters from which both water and organisms are consumed. NDMA is a highly mutagenic compound suspected of carcinogenic activity to the human body. NDMA is formed as a disinfection by-product from wastewater and chlorination. Historically, NDMA was used to make rocket fuel until contamination was found in air, soil and water. NDMA is produced currently only as a research chemical. Detection levels for NDMA are greater than the water quality criterion and can range from 0.002 µg/L to 30 µg/L. From June 2005 to July 2008, 15 percent of effluent samples detected NDMA at levels greater than the water criterion. However, this detection percentage may be underestimated since the detection levels for sampling effluent are often too high to detect low concentrations of NDMA. Similarly, the receiving water showed no detectable concentrations for NDMA, but the detection limits are too high to detect low concentrations. The California Department of Water Resources (DWR) is currently studying NDMA in the Sacramento-San Joaquin Delta. Preliminary data shows NDMA has not been detected at Hood, eight miles downstream of the discharge on the Sacramento River. However, DWR did find the NDMA precursors significantly greater (i.e., 3 to 4 times) below the discharge compared with above the discharge<sup>1</sup>

<sup>1</sup> "Investigation into the sources of nitrosamines and their precursors in the Sacramento-San Joaquin Delta, California", Carol L DiGiorgio, California Department of Water Resources, Municipal Water Quality Investigations Unit. Poster presented from 10 -11 August 2009.

(b) **RPA Results.** The maximum effluent concentration (MEC) for NDMA between June 2005-July 2008 was 0.044 µg/L (subsequently the MEC was 0.082 µg/L on 6 October 2008) out of 97 samples while the maximum observed upstream receiving water concentration was not detected out of 47 samples at a MDL of <0.01 µg/L. Therefore, NDMA in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBELs.** Although NDMA was not detected in the receiving water, the detection level for NDMA is greater than the water quality criterion. Therefore, there is no assimilative capacity, dilution credits are not allowed for development of the WQBELs for NDMA. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for NDMA of 0.00069 µg/L and 0.0014 µg/L, respectively, based on the CTR criterion for the protection of human health.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.0044 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for NDMA are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the NDMA effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### x. Pentachlorophenol

(a) **WQO.** The CTR includes a criterion of 0.28 µg/L for pentachlorophenol for the protection of human health for waters from which both water and organisms are consumed.

(b) **RPA Results.** The maximum effluent concentration (MEC) for pentachlorophenol was 5.7 µg/L out of 87 samples while the maximum observed upstream receiving water concentration was 0.026 µg/L out of 60 samples. Therefore, pentachlorophenol in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

(c) **WQBELs.** The receiving water contains assimilative capacity for pentachlorophenol, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for pentachlorophenol. Based on the

allowable dilution credit, an AMEL of 12 µg/L and a MDEL of 24 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of pentachlorophenol and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a final MDEL for pentachlorophenol of 18 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 5.7 µg/L is less than to the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible

#### xi. Tetrachloroethylene

- (a) WQO.** The CTR includes a criterion of 0.8 µg/L for tetrachloroethylene for the protection of human health for waters from which both water and organisms are consumed.

- (b) RPA Results.** The maximum effluent concentration (MEC) for tetrachloroethylene was 0.9 µg/L out of 73 samples while the maximum observed upstream receiving water concentration was 0.21 µg/L out of 43 samples. Therefore, tetrachloroethylene in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.

- (c) WQBELs.** The receiving water contains assimilative capacity for pentachlorophenol, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for tetrachloroethylene. Based on the allowable dilution credit, an AMEL of 37 µg/L and a MDEL of 75µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of pentachlorophenol and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a final MDEL for pentachlorophenol of 4.4 µg/L.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.9 µg/L is less than to the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

## xii. 1,2-Diphenyl-hydrazine

- (a) **WQO.** The CTR includes a criterion of 0.04 µg/L for 1,2-diphenyl-hydrazine for the protection of human health for waters from which both water and organisms are consumed.
- (b) **RPA Results.** The maximum effluent concentration (MEC) for 1,2-diphenyl-hydrazine was 2.8 µg/L J-flagged on 8 June 2007 with another J-flagged of 2.1 µg/L on 9 June 2007 out of 85 samples, while the maximum observed upstream receiving water concentration was not detected out of 17 samples at a MDL of <0.1 µg/L. Therefore, 1,2-diphenyl-hydrazine in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of human health.
- (c) **WQBELs.** Although 1,2-diphenyl-hydrazine was not detected in the receiving water, the detection limit for 1,2-diphenyl-hydrazine is greater than the water quality criterion. Therefore, there is no assimilative capacity, dilution credits are not allowed for development of the WQBELs for 1,2-diphenyl-hydrazine. This Order contains a final average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) for 1,2-diphenyl-hydrazine of 0.04 µg/L and 0.08 µg/L, respectively, based on the CTR criterion for the protection of human health.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 2.8 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for 1,2-diphenyl-hydrazine are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the 1,2-diphenyl-hydrazine effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

## xiii. Copper

- (a) **WQO.** The CTR includes hardness-dependant criteria for the protection of freshwater aquatic life for copper. The criteria for copper are presented in dissolved concentrations. USEPA recommends conversion factors to translate dissolved concentration to total concentrations. The USEPA default conversion factors for copper in freshwater of 0.96 for both the acute and the chronic criteria were used for the discharge

**(b) RPA Results.** For the effluent, the applicable copper chronic criterion (maximum 4-day average concentration) is 7.7 µg/L and the applicable acute criterion (maximum (1-hour concentration) is 11 µg/L, as total recoverable, (see Table F-9, above). The MEC for total copper was 6.34 µg/L, based on data collected between June 2005 and July 2008. For the receiving water, the applicable copper chronic criterion is 3.0 µg/L and the applicable acute criterion is 4.0 µg/L, as total recoverable, based on a hardness of 26 mg/L (as CaCO<sub>3</sub>), using USEPA default translators. The maximum observed upstream total copper concentration was 20.4 µg/L, based on data from 1992-2008. Based on this information, copper in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

**(c) WQBELs.** As discussed in Section IV.C.3.d.vi of the Fact Sheet, the Facility can meet end-of-pipe effluent limits for copper. Therefore, dilution credits have not been applied in the calculation of the WQBELs.

Using the acute and chronic ECAs for copper shown in Table F-9, above, this Order contains final Average Monthly Effluent Limitations (AMEL) and Maximum Daily Effluent Limitations (MDEL) for copper of 7.3 µg/L and 9.3 µg/L (total recoverable), respectively.

**(d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 6.7 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### xiv. Cyanide

**(a) WQO.** The CTR includes maximum 1-hour average and 4-day average criteria of 22 µg/L and 5.2 µg/L, respectively, for cyanide for the protection of freshwater aquatic life.

**(b) RPA Results.** The maximum effluent concentration (MEC) for cyanide was 10 µg/L while the maximum observed upstream receiving water concentration was 5.0 µg/L. Therefore, cyanide in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the CTR criterion for the protection of freshwater aquatic life.

**(c) WQBELs.** As discussed in Section IV.C.3.d.vi of the Fact Sheet, based on Facility performance acute aquatic life dilution is not needed and has not been allowed for cyanide. However, chronic aquatic life dilution may be allowed for cyanide. Based on results of the Discharger's dynamic model for compliance with the CTR criteria for cyanide at the edge of the chronic aquatic life mixing zone, MDEL of 22 µg/L, and an AMEL of 11 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the

receiving water's assimilation capacity of cyanide and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains a maximum daily effluent limitation (MDEL) for cyanide of 11 µg/L,

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 10 µg/L is less than the MDEL. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### xv. Manganese

- (a) WQO.** The Secondary MCL – Consumer Acceptance Limit for manganese is 50 µg/L which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply.
- (b) RPA Results.** The maximum effluent concentration (MEC) for dissolved manganese was 82 µg/L out of 34 samples while the maximum observed upstream receiving water concentration was 5 µg/L out of 7 samples. Therefore, manganese in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the secondary MCL.
- (c) WQBELs.** The receiving water contains assimilative capacity for manganese, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for manganese. Based on the allowable dilution credit, an annual average effluent limit of 2700 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of manganese and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). The performance-based annual average effluent limit is 85 µg/L. This Order contains MDEL for manganese of 85 µg/L.
- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 82 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

#### xvi. Methyl Tertiary Butyl Ether (MTBE)

- (a) WQO.** The Secondary MCL – Consumer Acceptance Limit for MTBE is 5.0 µg/L, which is used to implement the Basin Plan's chemical constituent objective for the protection of municipal and domestic supply.



- (b) **RPA Results.** The maximum effluent concentration (MEC) for methyl tertiary butyl ether (MTBE) was 5.8 µg/L out 101 samples while the maximum observed upstream receiving water concentration was 1.9 µg/L out of 30 samples. Therefore, MTBE in the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the secondary MCL.
- (c) **WQBELs.** The receiving water contains assimilative capacity for MTBE, therefore, a dilution credit of 56:1 was allowed in the development of the WQBELs for MTBE. Based on the allowable dilution credit, an annual average effluent limit of 260 µg/L is calculated. The Central Valley Water Board finds that granting of this dilution credit could allocate an unnecessarily large portion of the receiving water's assimilation capacity of MTBE and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is calculated (See Table F-20. Performance-based Effluent Limitations Statistics). This Order contains MDEL for MTBE of 18 µg/L.
- (d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 5.8 µg/L is less than the applicable WQBELs. The Central Valley Water Board concludes, therefore, that immediate compliance with these effluent limitations is feasible.

xvii. **Chlorine Residual**

- (a) **WQO.** USEPA developed NAWQC for protection of freshwater aquatic life for chlorine residual. The recommended 4-day average (chronic) and 1-hour average (acute) criteria for chlorine residual are 0.011 µg/L and 0.019 µg/L, respectively. These criteria are protective of the Basin Plan's narrative toxicity objective.
- (b) **RPA Results.** The Discharger uses chlorine for disinfection, which is extremely toxic to aquatic organisms. The Discharger uses a sulfur dioxide process to dechlorinate the effluent prior to discharge to Sacramento River. Due to the existing chlorine use and the potential for chlorine to be discharged, the discharge has a reasonable potential to cause or contribute to an in-stream excursion above the NAWQC.
- (c) **WQBELs.** The USEPA Technical Support Document for Water Quality-Based Toxics Control [EPA/505/2-90-001] contains statistical methods for converting chronic (4-day) and acute (1-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will be monitored continuously, an average 1-hour limitation is considered more appropriate than an average daily limitation. This Order contains a 4-day average effluent limitation and 1-hour average effluent limitation for chlorine residual of 0.011 µg/L and 0.019 µg/L, respectively, based on

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USEPA's NAWQC, which implements the Basin Plan's narrative toxicity objective for protection of aquatic life.

- (d) Plant Performance and Attainability.** Although, the Discharger violated the chlorine residual limit twice since June 2005, the Central Valley Water Board believes that immediate compliance with these effluent limitations is feasible.

**xviii. Chlorpyrifos**

- (a) WQO.** The Central Valley Water Board recently completed a total maximum daily load (TMDL) for chlorpyrifos in the Sacramento and Feather Rivers and amended the Basin Plan to include chlorpyrifos waste load allocations and water quality objectives on 16 October 2003. The Basin Plan now contains water quality objectives for chlorpyrifos of 0.02 µg/L as a 1-hour average and 0.014 µg/L as a 4-day average for the Sacramento River from the Colusa Basin Drain to the I Street Bridge. The Basin Plan also states that “[c]ompliance with water quality objectives, waste load allocations, and load allocations for chlorpyrifos in the Sacramento and Feather Rivers is required by June 30, 2008” and “[t]he waste load allocations for all NPDES-permitted discharges are the chlorpyrifos water quality objectives.”

- (b) RPA Results.** The maximum effluent concentration (MEC) for chlorpyrifos was 0.039 µg/L while the maximum observed upstream receiving water concentration was 0.006 µg/L. Therefore, chlorpyrifos in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

- (c) WQBELs.** Although there appears to be assimilative capacity in the vicinity of the discharge, the Sacramento-San Joaquin Delta is impaired for chlorpyrifos. As discussed in Section IV.C.2.d of the Fact Sheet, allowing dilution credits allows lower levels of treatment and control of the discharge and a higher mass loading of chlorpyrifos. Since the Delta is impaired for chlorpyrifos and chlorpyrifos may bioaccumulate in the food chain<sup>1</sup>, no dilution credits have been allowed in this Order. Therefore, this Order includes an AMEL of 0.012 µg/L and a MDEL of 0.025 µg/L for chlorpyrifos, based on the Basin Plan water quality objectives for chlorpyrifos.

- (d) Plant Performance and Attainability.** Analysis of the effluent data shows that the MEC of 0.039 µg/L is greater than applicable WQBELs. Based on the sample results for the effluent, the limitations appear to put

<sup>1</sup> *Reregistration Eligibility Decision (RED) for Chlorpyrifos*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC: 2006.

the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for chlorpyrifos are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the chlorpyrifos effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

**xix. Mercury**

- (a) **WQO.** The Central Valley Water Board adopted Resolution No. R5-2010-0043 on 22 April 2010, Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Methylmercury and total mercury in the Sacramento-San Joaquin Delta Estuary. The methylmercury amendment adopts an implementation plan for limiting methylmercury discharged by point sources, including the Discharger. Phase I of the amendments requires a performance limit based on the 99.9 percentile of 12-month running effluent inorganic (total) mercury loads (lbs/year). Additionally, the amendments assign wastewater methylmercury (MeHg) allocations, for the Discharger, the load allocation is 89 g/year as described in Table B – Municipal and Industrial Wastewater Methylmercury (MeHg) Allocations, Attachment 1 of the amendments.

The current NAWQC for protection of freshwater aquatic life, continuous concentration, for mercury is 0.77 µg/L (30-day average, chronic criteria). The CTR contains a human health criterion (based on a threshold dose level causing neurological effects in infants) of 0.050 µg/L for waters from which both water and aquatic organisms are consumed. Both values are controversial and subject to change. In 40 CFR Part 131, USEPA acknowledges that the human health criteria may not be protective of some aquatic or endangered species and that “...*more stringent mercury limits may be determined and implemented through use of the State’s narrative criterion.*” In the CTR, USEPA reserved the mercury criteria for freshwater and aquatic life and may adopt new criteria at a later date.

- (b) **RPA Results.** According to the February 2008 Delta methylmercury TMDL staff report, during water years 2000-2003 and the mercury TMDL staff, SRCSD contributed an annual average methylmercury load of 162 g/yr to the Delta, which is comparable to the amount of methylmercury contributed by the Cache Creek Settling Basin (137 g/yr). The March 2008 SRCSD Localized Bioaccumulation Study determined that SRCSD’s effluent contributes about the same amount of methylmercury to

bioaccumulation in the Sacramento River as expected from effluent and river methylmercury load estimates. SRCSD's discharge during the field work (July-November 2006, a low flow period during an overall wet year) represented about 1.5% of the flow and about 7% of the methylmercury load in the Sacramento River. Mercury in short-lived biosentinel fish (silversides and juvenile bass) increased 9 to 13% downstream of the outfall, but longer-lived fish (prickly sculpin) decreased by 9%. The Study report stated, "There was a measurable (i.e., statistically significant) effect of SRWTP effluent on most bio-indicator organisms downstream of the outfall during low-flow river conditions that provide the least amount of dilution. But, the evidence of localized environmental risk is not so clear and convincing that a reasonable decision maker would conclude that some action must be taken locally. The evidence presented in this report argues that an offset program "is acceptable for addressing the regional problem of mercury levels in fish." SRCSD methylmercury loading to the Sacramento River has generally decreased during the last several years. However, SRCSD has contributed as much as 20 to 30% of loading to the river during drier periods when effluent mercury concentrations were higher, and could make similarly substantial contributions during future dry periods, especially if SRCSD increases its discharge.

The maximum observed effluent mercury concentration was 0.0106µg/L. Mercury bioaccumulates in fish tissue and, therefore, the discharge of mercury to the receiving water may contribute to exceedances of the narrative toxicity objective and impact beneficial uses. The Sacramento-San Joaquin Delta has been listed as an impaired water body pursuant to CWA section 303(d) because of mercury and the discharge must not cause or contribute to increased mercury levels.

**(c) WQBELs.** This Order contains a performance-based mass effluent limitation of 2.3 lbs/year for total mercury for the effluent discharged to the receiving water. The mass limitation was derived in accordance with the Delta Methylmercury TMDL (The 99.9<sup>th</sup> percentile of running annual total mercury loading based on effluent data from January 2005 through April 2010.) Order No. 5-00-188 prescribed a mercury mass load limit and a mercury "credit" program. The Discharger discharged less than the prescribed load limit, so has accumulated mercury discharge credits. Since this permit establishes a performance-based mercury limit with which the discharger can comply, the accumulated credit is not applied against future discharges under this Order.

**(d) Plant Performance and Attainability.** The new effluent limitation for mercury is based on the performance of the Facility, therefore, immediate compliance can be achieved.

## xx. Nitrate and Nitrite

- (a) **WQO.** DPH has adopted Primary MCLs for the protection of human health for nitrite and nitrate that are equal to 1 mg/L and 10 mg/L (measured as nitrogen), respectively. DPH has also adopted a primary MCL of 10 mg/L for the sum of nitrate and nitrite, measured as nitrogen.

USEPA has developed a primary MCL and an MCL goal of 1 mg/L for nitrite (as nitrogen). For nitrate, USEPA has developed Drinking Water Standards (10 mg/L as Primary MCL) and NAWQC for protection of human health (10 mg/L for non-cancer health effects). Recent toxicity studies have indicated a possibility that nitrate is toxic to aquatic organisms.

- (b) **RPA Results.** Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Denitrification is a process that converts nitrate to nitrite or nitric oxide and then to nitrous oxide or nitrogen gas, which is then released to the atmosphere. Nitrate and nitrite are known to cause adverse health effects in humans. Inadequate or incomplete denitrification may result in the discharge of nitrate and/or nitrite to the receiving stream. The conversion of ammonia to nitrites and the conversion of nitrites to nitrates present a reasonable potential for the discharge to cause or contribute to an in-stream excursion above the Primary MCLs for nitrite and nitrate.

Currently, the Discharger's effluent contains very low concentrations of nitrate, ranging from 0.016 to 1.4 mg/L with an average of 0.13 mg/L. However, this Order requires the Discharger fully nitrify its effluent, therefore, the ammonia will convert to nitrate and the nitrate concentrations will increase substantially. Therefore, the discharge has reasonable potential to cause or contribute to an exceedance of the water quality objectives for nitrite and nitrate in the receiving water.

- (c) **WQBELs.** Nitrogen is an essential nutrient to life. Nitrogen in nitrates is readily available for use by plants. As with ammonia, excessive nitrogen can contribute to excessive or changed growth in a water body, changing the ecology of the water body. There are theories that changing the ratio of nitrogen to phosphorus can change the ecology of a waterbody, so removal of nitrogen from the effluent would keep the nitrogen to phosphorus ratio from changing. The removal of nitrate and nitrite (i.e., denitrification) is technologically feasible and is often used at POTWs. Therefore, due to the concerns of adverse effects to aquatic life from nitrogen this Order requires the wastewater is fully denitrified. An average monthly effluent limit of 0.26 mg/L for nitrate (as nitrogen) is included in this Order. This is based on the Discharger's study prepared by Larry Walker Associates, titled, "Technical Memorandum: Analysis of Costs and

Benefits of Advanced Treatment Alternatives for the Sacramento Regional Wastewater Treatment Plant,” dated May 2010.

- (d) Plant Performance and Attainability.** Analysis of the effluent data demonstrates that the Facility can immediately comply with the new WQBELs for nitrate.

**xxi. Pathogens**

- (a) WQO.** DPH has developed reclamation criteria, CCR, Division 4, Chapter 3 (Title 22), for the reuse of wastewater. Title 22 requires that for spray irrigation of food crops, parks, playgrounds, schoolyards, and other areas of similar public access, wastewater be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median. As coliform organisms are living and mobile, it is impracticable to quantify an exact number of coliform organisms and to establish weekly average limitations. Instead, coliform organisms are measured as a most probable number and regulated based on a 7-day median limitation.

Title 22 also requires that recycled water used as a source of water supply for non-restricted recreational impoundments be disinfected tertiary recycled water that has been subjected to conventional treatment. A non-restricted recreational impoundment is defined as “...an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities.” Title 22 is not directly applicable to surface waters; however, the Central Valley Water Board finds that it is appropriate to apply an equivalent level of treatment to that required by the Department of Public Health’s reclamation criteria because the receiving water is used for irrigation of agricultural land and for contact recreation purposes. The stringent disinfection criteria of Title 22 are appropriate since the undiluted effluent may be used for the irrigation of food crops and/or for body-contact water recreation. Coliform organisms are intended as an indicator of the effectiveness of the entire treatment train and the effectiveness of removing other pathogens.

- (b) RPA Results.** The beneficial uses of the Sacramento-San Joaquin Delta include municipal and domestic supply, water contact recreation, and agricultural irrigation supply. To protect these beneficial uses, the Central Valley Water Board finds that the wastewater must be disinfected and adequately treated to prevent disease. The method of treatment is not prescribed by this Order; however, wastewater must be treated to a level equivalent to that recommended by DPH.

Pathogens include bacterium, viruses and protozoans, which exist in natural waters and wastewater. Pathogens are difficult to detect, because of the typically low abundance in most waters. Therefore, indicator

bacteria (e.g., total coliform organisms) are used as a barometer of pathogen water quality. NPDES permits include total coliform limitations to measure the effectiveness of disinfection processes. Specific protozoans of concern for the Central Valley Drinking Water Group are *Giardia* and *Cryptosporidium* from human and animal fecal waste. Both protozoans are in municipal wastewater and can cause diarrhea, vomiting and cramps. For immune suppressed individuals, the illness can be very serious, including death.

The Sacramento River near the diffuser is a popular sport fishing area<sup>1</sup>. In addition, there are at least 20 agricultural diversions within 1 mile upstream and 2 miles downstream of the discharge<sup>2</sup>. Based upon information submitted by SRCSD, the typical construction of the agricultural irrigation water intakes in the vicinity of the outfall would draw water from near the bank of the river, below the water surface (deep enough to not go dry during low river levels, but far enough from the river bottom to not be impacted by bottom sediments). It appears that undiluted effluent will not be drawn into the agricultural intakes, but varying mixtures of effluent and river water will be diverted from the partially mixed discharge plume. The nearest drinking water intake is approximately one mile upstream at the new Freeport water intake. River flow modeling conducted by SRCSD concluded that the SRCSD discharge will not be carried far enough upriver during incoming tides to be captured by the Freeport intake, however an operating agreement between the East Bay Municipal Utility District and SRCSD will prevent diversion of river water possibly containing diluted treated wastewater at the Freeport water intake. The diffuser for the discharge to the Sacramento River is located in the vicinity of many agricultural water intakes and an area popular with fishermen.

In a 11 May 2009 letter to the California Department of Public Health (DPH), Central Valley Water Board staff requested guidance on the appropriate disinfection requirements for the removal of pathogens in the renewed NPDES permit for protection of beneficial uses for contact recreation and agricultural irrigation. Central Valley Water Board staff also requested DPH's advice on whether the Discharger's chlorine disinfection system would be expected to provide adequate disinfection to kill pathogenic organisms. Furthermore, Central Valley Water Board staff requested guidance on whether Dr. Robert Emerick's<sup>3</sup> research that the

<sup>1</sup> "Localized Mercury Bioaccumulation Study", Larry Walker Associates, March 2008, Figure ES-1.

<sup>2</sup> NPDES Permit Renewal Issues – Drinking Water Supply and Public Health, SRWTP, 14 December 2009, CVRWQCB

<sup>3</sup> Emerick, Robert W., Factors Influencing Ultraviolet Disinfection Performance Part II: Association of Coliform Bacteria with Wastewater Particles, Water Environment Research, Volume 71, Number 6, 2000.

Discharger's effluent had high (20) percent of coliform associated particles could be under estimating the pathogenic risk of the discharge. This concern is due to the fact that the multiple-tube fermentation test used to measure the total coliform organisms in the effluent does not adequately enumerate target organisms that occur in a particle-associated state.

DPH requested a formal health risk assessment be conducted to determine the risk of *Giardia* cysts and *Cryptosporidium* oocysts might pose to persons engaging in body contact recreation in the portions of the Sacramento River affected by the discharge. DPH determined that if contact recreation is protected then agricultural irrigation would also be protected.

The Discharger engaged the professional services of Dr. Charles Gerba of the University of Arizona to conduct the human health risk assessment. The assessment determined the risk to pathogenic protozoans nearly quadruples from upstream of the discharge to downstream of the discharge. Dr. Gerba's risk assessment concluded that SRWTP discharge did not exceed the USEPA's water quality criteria for contact recreation. Based on Dr. Gerba's "Estimated Risk of Illness from Swimming in the Sacramento River", 23 February 2010, the DPH recommended in a letter dated, 15 June 2010, to Central Valley Water Board that the Discharger provide "additional treatment sufficient to reduce the additional risk of infection posed by exposure to its discharge to as close to 1 in 10,000 as can be achieved by a cost-effective combination of using filtration and/or a disinfection process that effectively inactivates *Giardia* cysts and *Cryptosporidium* oocysts". DPH concluded that providing additional treatment would also address the concerns with the lack of a chlorine contact chamber as well as particle-associated coliform in the SRWTP's effluent.

The Discharger disagreed with the DPH in a letter to the Central Valley Water Board dated and 30 June 2010. The Discharger contended:

- (1) Risk levels due to *Cryptosporidium* and *Giardia* in the Sacramento River do not show a statistically significant difference between upstream of the discharge and immediately downstream of the discharge, however, minor statistically significant change in risk is determined 1.5 miles downstream of the discharge and may be due to other impacts.
- (2) DPH's risk of 1 in 10,000 is contrary to 1986 USEPA's national risk criteria of 8 illnesses in 1,000 exposures.
- (3) DPH's contention that the 1986 criteria for contact recreational use protection are outdated or did not consider human pathogens is incorrect.
- (4) Dr. Gerba's assumptions are very conservative and changing just one assumption would reduce the risk to less than 1 in 10,000.



**(5) DPH's recommendation is establishing a new unadopted standard that exceeds requirements for other NPDES permits.**

The changes in operation and/or treatment necessary to achieve the limited pathogen reduction recommended by DPH have not been evaluated at this time, and it is uncertain what effluent limitations could be imposed in this permit to achieve the pathogen reduction recommended by DPH. Additionally, it is possible that further refinement of the Discharger's health risk assessment would demonstrate that the Discharger already achieves the health risk recommended by DPH. Therefore the DPH recommendations are not directly implemented by this permit.

Given the very high level of public contact with the receiving water, the use of the receiving water for irrigation which can result in human contact with pathogens, and extensive use of Delta waters as private and public water supplies, any increased risk of illness and infection from exposure to the wastewater is not protective of the municipal, agricultural or recreational beneficial use. This permit requires an essentially pathogen-free wastewater, which will incidentally implement DPH's recommendation to improve the level of disinfection to remove protozoa in addition to bacteria, enteric virus and other pathogens. Several technologies are available to achieve this, all essentially involving filtration to produce a very low-solids effluent, which is then dosed with a disinfectant (usually chlorine or UV light). The combination of filtration and disinfectant effectively removes all pathogens. Requirements of Title 22 will be adequate to meet the 1 in 10,000 risk and 1 log removal recommended by the DPH.

In addition to protecting the beneficial uses of agricultural irrigation and contact recreation, filtration will also reduce total organic carbon (TOC), a constituent of concern for the Drinking Water Advisory Group, and substantial reductions in effluent concentrations for copper, mercury, TSS and BOD. BOD is a concern due to its oxygen demand to the Sacramento River. Improved effluent treatment may also reduce concentrations of other constituents, such as Constituents of Emerging Concern (CECs), although whether or not reductions of these chemicals do occur, and the magnitude of any such reductions, is unknown at this time. Similar POTWs that implement tertiary treatment and discharge to the Sacramento-San Joaquin Delta or its tributaries include:

Community of El Dorado Hills  
City of Manteca  
City of Stockton  
City of Lodi  
City of Galt  
City of Tracy  
City of Rio Vista

City of Roseville  
City of Woodland  
City of Placerville  
Community of Colfax  
Live Oak  
Community of Mountain House  
Linda County Water District

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- (c) **WQBELs.** In accordance with the requirements of Title 22, this Order includes effluent limitations for total coliform organisms of 2.2 MPN/100 mL as a 7-day median; 23 MPN/100 mL, not to be exceeded more than once in a 30-day period; and 240 MPN/100 mL as an instantaneous maximum.

In addition to coliform limitations, a turbidity specification has been included as a second indicator of the effectiveness of the treatment process and to assure compliance with the required level of treatment. The tertiary treatment process, or equivalent, is capable of reliably meeting a turbidity of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the filtration system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. Coliform testing, by comparison, is not conducted continuously and requires several hours, to days, to identify high coliform concentrations. To ensure compliance with the DPH Title 22 disinfection criteria, this Order contains operational turbidity specifications to be met prior to disinfection.

- (d) **Plant Performance and Attainability.** New or modified control measures will be necessary in order to comply with the effluent limitations for total coliform organisms, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for filtration are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. The Discharger submitted an infeasibility analysis dated August 2010 for compliance with these disinfection requirements. Therefore, a compliance time schedule for compliance with the total coliform organisms effluent limitations and a requirement to provide Title 22 (or equivalent) tertiary filtration is established in this Order.

## xxii. pH

- (a) **WQO.** The Basin Plan includes a water quality objective for surface waters (except for Goose Lake) that the "...pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses."
- (b) **RPA Results.** The discharge of domestic wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plan's numeric objectives for pH.

(c) **WQBELs.** Effluent limitations for pH of 6.5 as an instantaneous minimum and 8.5 as an instantaneous maximum are included in this Order based on protection of the Basin Plan objectives for pH.

(d) **Plant Performance and Attainability.** Analysis of the effluent data shows that the pH is less than the applicable WQBELs. New or modified control measures will be necessary in order to comply with the effluent limitations for pH, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for pH are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the pH effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### xxiii. **Settleable Solids**

(a) **WQO.** For inland surface waters, the Basin Plan states that “[w]ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.”

(b) **RPA Results.** The discharge of domestic wastewater has a reasonable potential to cause or contribute to an excursion above the Basin Plan’s narrative objective for settleable solids. The maximum effluent concentration (MEC) for settleable solids was 2.5 ml/L. Therefore, settleable solids in the discharge has reasonable potential to cause or contribute to an in-stream excursion above the narrative toxicity objective or Basin Plan numeric objectives and waste load allocation.

(c) **WQBELs.** This Order contains average monthly and average daily effluent limitations for settleable solids. Because the amount of settleable solids is measured in terms of volume per volume without a mass component, it is impracticable to calculate mass limitations for inclusion in this Order. A daily maximum effluent limitation for settleable solids is included in the Order, in lieu of a weekly average, to ensure that the treatment works operate in accordance with design capabilities.

(d) **Plant Performance and Attainability.** Only one violation of the settleable solids occurred since 2005. Therefore, based on existing performance the Facility can immediately comply the new final WQBELs for settleable solids.

#### xxiv. Temperature

(a) **WQO.** The Thermal Plan requires that, *“The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.”*

(b) **RPA Results.** The SRWTP discharges to the Sacramento River via a 400-foot outfall (300-foot diffuser with 74 ports) that is placed on the bottom of the river perpendicular to the river flow. The Sacramento River in the vicinity of the discharge is approximately 600 feet wide at the surface, about 400 feet wide at the bottom and 25 - 30 feet deep. The Sacramento River at the point of discharge experiences tidal flows that slow the river flow, and at times cause flow reversals. The existing NPDES permit adopted in 2000 (Order No. 5-00-188), prohibits river discharge when the flow ratio (Sacramento River: effluent) is less than 14:1. The existing permit also prohibits discharge when river flows are less than 1,300 cubic feet per second (cfs). These discharge prohibitions are based on the design of the outfall diffuser to ensure adequate mixing of effluent with river water. When either of these two conditions exists, the SRCSD ceases its surface water discharge and diverts treated effluent to storage basins.

The Lower Sacramento River and Delta serve as a migration corridor and /or provide other types of habitat (e.g., spawning, rearing) for many anadromous fish species. In addition, the lower Sacramento River supports numerous resident native and introduced fish species and diverse assemblage of BMIs, an important source for many adult and juvenile fishes. The following table lists those species of concern that may be impacted within the vicinity of the discharge:

Common Name	Scientific Name	Anadromous/ Resident	Status
Chinook salmon	Onocorhynchus lshawytscha		
Fall-run	Onocorhynchus lshawytscha	Anadromous	FSC
Late-fall run	Onocorhynchus lshawytscha	Anadromous	CSC, FSC
Spring-run	Onocorhynchus lshawytscha	Anadromous	ST, FT
Winter-run	Onocorhynchus lshawytscha	Anadromous	SE, FE
Steelhead trout	O. mykiss	Anadromous	FT
Green sturgeon	Acipenser medirostros	Anadromous	FC, CSC/C1
Striped bass	Morone saxatilis	Anadromous	I
American shad	Alsea sapidissima	Anadromous	I
White sturgeon	A. transmontanus	Anadromous	N
River lamprey	Lampetra ayresi	Anadromous	CSC/C2
Pacific lamprey	L. tridentate	Anadromous	FSC
Hardhead	Mylopharidion conocephalus	Resident	CSC/C2
Splittail	Pogonichthys macrolepidotus	Resident	CSC
Delta smelt	Hypomesus transpacificus	Resident	FT, SE
Status Codes	FE = Federally listed as endangered FT = Federally listed as threatened FSC = Federal Species of Concern SE = Listed as endangered by California N = Native species, no State or federal status ST = Listed as threatened by California CSC = CA Species of Concern C1 = Should be listed as threatened or endangered C2 = Declining, potentially threatened I = Introduced, no State or federal status		

As a condition of Waste Discharge Order No. 5-00-188, the Discharger completed and submitted a study assessing the thermal impacts of its discharge in the Sacramento River to the National Marine Fisheries Services (NMFS), titled “Thermal Effects of Sacramento Regional Wastewater Treatment Plant Discharges on Migrating Fishes of the Sacramento River, February 2005.” This thermal impact assessment recommended continuation of the existing thermal plan exemptions. The 2005 Thermal Study was previously reviewed by NMFS staff and they did not indicate any concerns with the proposed Thermal Plan exception. Since this time, however, conditions under which the evaluation was made have changed. There has been a significant pelagic organism decline in the Delta, new species are threatened and there has been a change in the diffuser configuration. In December 2009, the Discharger requested revised changes to their Thermal Plan exemption. In June 2010, the Discharger in a letter to the Central Valley Water Board withdrew its request for an expanded wastewater treatment plant. Due to these changes the Discharger prepared a new study, “Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant”, July 2010. With this revised July 2010 study, new thermal plan exemptions were requested.

Table F-16 below outlines the Thermal Plan requirements, the Thermal Plan exception allowed in the current NPDES permit, and the Discharger’s most recent proposed Thermal Plan exception request for the NPDES permit renewal.

**Table F-16. Existing and Proposed Thermal Plan Exception Requirements**

<b>Thermal Plan Requirements (Section 5.A.(1)a-c)</b>	<b>Existing NPDES Permit Requirements (181 mgd discharge)</b>	<b>SRCSO Proposed NPDES Requirements (181 mgd)</b>
<p><b>5.A.(1)a</b></p> <p>The maximum effluent temperature shall not exceed the natural receiving water temperature by more than 20°F</p>	<p>The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than: 25° F from 1 October through 30 April; -or- 20° F from 1 May through 30 September (meets Thermal Plan requirements)</p>	<p>The daily average temperature of the effluent shall not exceed the daily average natural receiving water temperature by more the 20°F 1 April through 30 September, or by more the 25°F 1 October through 31 March</p>
<p><b>5.A.(1)b</b></p> <p>Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.</p>	<p>If the natural receiving water temperature is less than 65° F: The discharge shall not create a zone, defined by water temperature of more than 2° F above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution. If the natural receiving water temperature is 65° F or greater: Meets Thermal Plan requirements at any point outside the zone of initial dilution.</p>	<p>The discharge shall not create a zone, defined by water temperatures of more than 2.5°F above natural receiving water temperature, which exceeds 50 percent of the cross-sectional area of the river at any point, evaluated as a daily average.</p>
<p><b>5.A.(1)c</b></p> <p>No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.</p>	<p>No Exception (Meets Thermal Plan Requirements)</p>	<p>The discharge shall not cause a surface water temperature rise greater than 4°F above the natural temperature of the river at any time or place.</p>

The July 2010 thermal plan exception justification study is based on the dynamic model for temperature performed by Flow Science. The modeled temperature plumes show a zone of passage at the surface of the Sacramento River approximately 75-100 feet wide on the west bank and 175-200 feet wide on the east bank. The surface width of the river at the diffuser is 600 feet. The zone of passage at the bottom of the river is smaller due to the configuration of the west bank. The study concluded that both surface water swimming fish and bottom water swimming fish would avoid the heated plume by swimming around or on top of it.

According to the United States Fish and Wildlife Service, the range of delta smelt extends from San Pablo Bay upstream to about Verona on the Sacramento River, though the majority of the population occupies from western Suisun Bay to about the City of Sacramento. Delta smelt enter the Sacramento River and Deep Water Ship Channel year round and

specifically from late December to June to spawn in temperatures between about 12-18°C. Pre-spawning adults could be expected in the vicinity of the City of Sacramento from the latter part of December through June. Some larvae could be expected in the vicinity of the City of Sacramento during February through June. During the larval stage delta smelt are at their most vulnerable to zones of poor water quality or high water temperature due to their small size and limited mobility.

The Critical Thermal Maxima (CTM) is the temperature for a given species above which most individuals respond with unorganized locomotion and is considered to be the lethal temperature, for juvenile and adult delta smelt it is reported as 25.4°C (77.7°F).<sup>1</sup> Delta smelt egg survival decreases at temperatures above 15-16°C (about 60°F) and is greatly reduced by 20°C (68°F).<sup>2</sup> Other ways to affect aquatic organisms include the rate of temperature change and the organism's ability to avoid or move to more favorable temperatures.

Central Valley Water Board staff requested the National Marine Fisheries Service (NMFS), the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game evaluate the July 2010 study and make recommendations on the thermal plan exception request by the Discharger.

The USFWS expressed several concerns about the lack of knowledge on the synergistic effects of multiple pollutants, like chemical and thermal contamination. The concern that potential of thermal discharges may create winter refugia for non-native predator species and uncertainty about the near-field thermal conditions and delta smelt's migration behavior.

The USFWS recommends the exception from WDR No. 5-00-188 be retained and no further exception be permitted for protection of Delta smelt. Additionally, the USFWS recommends the Discharger initiate planning to address future increases in the discharge with consideration for changes in the Sacramento River as a result of climate change without the need for sequential Thermal Plan exceptions. To determine whether permitted conditions are protective of delta smelt and Sacramento River

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<sup>1</sup> Swanson, Christina, Turid Reid, Paciencia S. Young and Joseph J. Cech, Jr. 2000. Comparative environmental tolerances of threatened delta smelt (*Hypomesus transpacificus*) and introduced wakasagi (*H. nipponensis*) in an altered California estuary. *Oecologia* 123: 384-390.

<sup>2</sup> Bennett, WA. 2005. Critical assessment of the delta smelt population in the San Francisco Estuary, California. *San Francisco Estuary and Watershed Science* 3.

biota, the USFWS requests specific monitoring and studies be conducted and include the following:

- (1) Continuous monitoring of the thermal discharge in coordination with mixing zone monitoring during December-June.
- (2) Study using hydroacoustic technology to determine if there are aggregations of large fish or schools of small fish in the zone of elevated water temperature that are atypical compared to other nearby mid-channel river reaches.
- (3) Acute and chronic testing with rainbow trout bi-weekly during December-June for two years with ambient water upstream of Freeport Bridge and 65 feet for acute and 360 feet for chronic downstream of the diffuser.

(c) **WQBELs.** To ensure compliance with the Thermal Plan, an effluent limitation for temperature is included in this Order.

(d) **Plant Performance and Attainability.** Based on the dynamic model results for the effluent, the limitations appear to put the Discharger in immediate non-compliance. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for temperature are a new regulatory requirement within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after 1 July 2000. Therefore, a compliance time schedule for compliance with the temperature effluent limitations is established in TSO No. R5-2010-XXXX in accordance with CWC section 13300, that requires preparation and implementation of a pollution prevention plan in compliance with CWC section 13263.3.

#### 4. WQBEL Calculations

- a. This Order includes WQBELs for copper, ammonia, cyanide, carbon tetrachloride, chlorodibromomethane, dichlorobromomethane, methylene chloride, tetrachloroethylene, pentachlorophenol, bis(2-ethylhexyl) phthalate, dibenzon(ah)anthracene, 1,2-diphenyl-hydrazine, N-nitrosodimethylamine, aluminum, nitrate, nitrite, manganese, MTBE, mercury, temperature, settleable solids and chlorpyrifos. As discussed above in Section IV.C.2.d, the Discharger developed a dynamic mathematical model to evaluate near-field dilution and a mixing zone for compliance with chronic aquatic life criteria has been granted. The Discharger's dynamic model has been used to calculate the WQBELs for copper, ammonia, cyanide, and chlorpyrifos. For the remaining constituents a steady-state approach has been used to calculate the WQBELs. The general steady-state methodology for calculating WQBELs based on the different criteria/objectives is described in subsections IV.C.4.b through e, below. See

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Attachment H for the WQBEL calculations. The methodology for calculating WQBELs using the dynamic model is discussed in subsection IV.C.4.f, below.

- b. Effluent Concentration Allowance.** For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP:

$$\begin{aligned} ECA &= C + D(C - B) && \text{where } C > B, \text{ and} \\ ECA &= C && \text{where } C \leq B \end{aligned}$$

where:

ECA = effluent concentration allowance  
D = dilution credit  
C = the priority pollutant criterion/objective  
B = the ambient background concentration.

According to the SIP, the ambient background concentration (B) in the equation above shall be the observed maximum with the exception that an ECA calculated from a priority pollutant criterion/objective that is intended to protect human health from carcinogenic effects shall use the arithmetic mean concentration of the ambient background samples. For ECAs based on MCLs, which implement the Basin Plan's chemical constituents objective and are applied as annual averages, an arithmetic mean is also used for B due to the long-term basis of the criteria.

- c. Basin Plan Objectives and MCLs.** For WQBELs based on site-specific numeric Basin Plan objectives or MCLs, the effluent limitations are applied directly as the ECA as either an MDEL, AMEL, or average annual effluent limitations, depending on the averaging period of the objective.
- d. Aquatic Toxicity Criteria.** WQBELs based on acute and chronic aquatic toxicity criteria are calculated in accordance with Section 1.4 of the SIP. The ECAs are converted to equivalent long-term averages (i.e.  $LTA_{\text{acute}}$  and  $LTA_{\text{chronic}}$ ) using statistical multipliers and the lowest LTA is used to calculate the AMEL and MDEL using additional statistical multipliers.
- e. Human Health Criteria.** WQBELs based on human health criteria, are also calculated in accordance with Section 1.4 of the SIP. The ECAs are set equal to the AMEL and a statistical multiplier was used to calculate the MDEL.

$$AMEL = mult_{AMEL} \left[ \min \left( \overbrace{M_A ECA_{acute}}^{LTA_{acute}}, M_C ECA_{chronic} \right) \right]$$

$$MDEL = mult_{MDEL} \left[ \min \left( M_A ECA_{acute}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}} \right) \right]$$

$$MDEL_{HH} = \left( \frac{mult_{MDEL}}{mult_{AMEL}} \right) AMEL_{HH}$$

where:

*mult*<sub>AMEL</sub> = statistical multiplier converting minimum LTA to AMEL

*mult*<sub>MDEL</sub> = statistical multiplier converting minimum LTA to MDEL

*MA* = statistical multiplier converting acute ECA to LTA<sub>acute</sub>

*MC* = statistical multiplier converting chronic ECA to LTA<sub>chronic</sub>

- f. Dynamic Model.** Section 1.4.D. of the SIP allows the use of a dynamic model to calculate WQBELs. Chapter 5.4.1 of the TSD (see page 101) provides guidance for deriving WQBELs using a dynamic model. A three step process has been used in this Order to derive WQBELs using the Discharger's dynamic model<sup>1</sup>.

- (1) A point of compliance (edge of mixing zone) is selected. For acute aquatic life criteria the edge of the acute mixing zone is selected and for chronic aquatic life criteria the edge of the chronic mixing zone is selected.
- (2) An LTA is developed for both acute and chronic criteria (i.e., LTA<sub>acute</sub> and LTA<sub>chronic</sub>) by iteratively running the dynamic model with successively lower [or higher] LTAs until the model shows compliance with the water quality criteria at the edge of the mixing zone at the appropriate frequency of compliance and averaging period (e.g., acute criteria are typically based on a 1-hour average exposure and chronic criteria are based on a 4-day exposure).
- (3) The LTA and CV are used to derive MDELs and AMELs using the steady-state procedures described in Step 5 of Section 1.4 of the SIP. WQBELs are calculated using the LTA<sub>acute</sub> and LTA<sub>chronic</sub> and the more stringent WQBELs are applied.

<sup>1</sup> These procedures are discussed in more detail in a Technical Memorandum from Larry Walker Associates to SRCSD titled, "Calculation of WQBEL via Output from a Dynamic Model – DRAFT", 23 February 2009

## Summary of Water Quality-Based Effluent Limitations Discharge Point No. EFF- 001

**Table F-17. Summary of Water Quality-Based Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Conventional Pollutants						
Biochemical Oxygen Demand, 5-day @ 20°C	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
Total Suspended Solids	mg/L	10	15	20	--	--
	lbs/day <sup>1</sup>	15,100	22,700	30,200	--	--
pH	standard units	--	--	--	6.5	8.5
Priority Pollutants						
Bis(2-ethylhexyl)phthalate	µg/L	--	--	13		
Carbon Tetrachloride	µg/L	--	--	5.3	--	--
Chlorpyrifos	µg/L	0.012	--	0.025	--	--
Chlorodibromomethane	µg/L	--	--	2.2	--	--
Copper, Total Recoverable	µg/L	7.3	--	9.3	--	--
Cyanide	µg/L	--	--	11	--	--
Dibenzo(ah)anthracene	µg/L	0.2	--	0.4		
Dichlorobromomethane	µg/L	--	--	3.4	--	--
Methylene Chloride	µg/L	4.7	--	11	--	--
N-nitrosodimethylamine	µg/L	0.00069	--	0.0014	--	--
Pentachlorophenol	µg/L	--	--	18	--	--
Tetrachloroethylene	µg/L	--	--	4.4	--	--
1,2-Diphenyl-hydrazine	µg/L	0.04	--	0.08	--	--
Non-Conventional Pollutants						
Settleable Solids	ml/L	0.1	--	0.2	--	--
Aluminum, Total	µg/L	503	--	750	--	--
Ammonia Nitrogen, Total (as N)	mg/L	1.8	--	2.2	--	--
	lbs/day <sup>1</sup>	2720	--	3320	--	--
Nitrate, Total (as N)	mg/L	0.26	--	--	--	--
Manganese, Total Recoverable	µg/L	--	--	85	--	--
Methyl Tertiary Butyl Ether	µg/L	--	--	18	--	--

<sup>1</sup> Based on a design average dry weather flow of 181 MGD.

- b. Percent Removal.** The average monthly percent removal of 5-day biochemical oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) shall not be less than 85 percent.
- c. Chronic Whole Effluent Toxicity.** There shall be no chronic whole effluent toxicity in the effluent discharge.
- d. Acute Whole Effluent Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

1. 70%, minimum for any one bioassay; and
  2. 90%, median for any three consecutive bioassays.
- e. Temperature.** The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than 20°F from 1 May through 30 September and more than 25°F from 1 October through 30 April.
- f. Total Residual Chlorine.** Effluent total residual chlorine shall not exceed:
1. 0.011 mg/L, as a 4-day average; and
  2. 0.019 mg/L, as a 1-hour average.
- g. Total Coliform Organisms.** Effluent total coliform organisms shall not exceed:
2. 2.2 most probable number (MPN) per 100 mL, as a 7-day median;
  3. 23 MPN/100 mL, more than once in any 30-day period; and
  4. 240 MPN/100 mL, at any time.
- h. Average Dry Weather Flow.** The average dry weather discharge flow shall not exceed 181 mgd.
- i. Aluminum, Total Recoverable.** Effluent total recoverable aluminum concentrations shall not exceed 200 µg/L as a calendar annual average.

## 5. Whole Effluent Toxicity (WET)

For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct whole effluent toxicity testing for acute and chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E section V.). This Order also contains numeric effluent limitations for acute toxicity, a narrative effluent limitation for chronic toxicity, and requires the Discharger to implement best management practices to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

- a. Acute Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page **III-8.00**). The Basin Plan also states that, "*...effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...*". USEPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70%*

*survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc."*  
Accordingly, effluent limitations for acute toxicity have been included in this Order as follows:

**Acute Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

Minimum for any one bioassay--	70%
Median for any three consecutive bioassays -----	90%

The previous permit required the acute bioassays be performed using 100% effluent and using fathead minnows (*Pimephales promelas*) as the test species. This order continues to require the acute bioassays be performed using 100% effluent and changes the test species to rainbow trout (*Oncorhynchus mykiss*) due to the presence of salmonids in the receiving water. The Discharger will need six months to modify its system to use rainbow trout and obtain ELAP certification. Therefore, this Order includes an effective date of 1 July 2011 to begin using rainbow trout. In the interim, this Order allows the testing be performed using fathead minnows.

- b. Chronic Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00. Since the Facility is a publicly-owned treatment works that is categorized as a major facility, the influent can be highly variable due to commercial, industrial, and other inputs. Therefore, it is assumed that the discharge has chronic whole effluent toxicity (WET) levels that have a reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective. This Order includes a narrative effluent limitation for chronic toxicity, chronic WET monitoring requirements, and a provision that requires the Discharger to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity.

The Monitoring and Reporting Program of this Order requires quarterly chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, the Special Provision in section VI.C.2.a. of the Order requires the Discharger to submit to the Central Valley Water Board an updated TRE Workplan for approval by the Executive Officer. The provision also includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

## D. Final Effluent Limitations

### 1. Mass-based Effluent Limitations

40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g., CTR criteria and MCLs) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations were calculated based upon the design flow (Average Dry Weather Flow) permitted in section IV.A.1.<X>. of this Order.

### 2. Averaging Periods for Effluent Limitations

40 CFR 122.45 (d) requires average weekly and average monthly discharge limitations for publicly owned treatment works (POTWs) unless impracticable. However, for toxic pollutants and pollutant parameters in water quality permitting, USEPA recommends the use of a maximum daily effluent limitation in lieu of average weekly effluent limitations for two reasons. *“First, the basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards. Second, a 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge’s potential for causing acute toxic effects would be missed.”* (TSD, pg. 96) This Order utilizes maximum daily effluent limitations in lieu of average weekly effluent limitations for aluminum, ammonia, manganese, MTBE, bis(2-ethylhexyl)phthalate, carbon tetrachloride, chlorpyrifos, copper, cyanide, chlorodibromomethane, dichlorobromomethane, dibenzon(a,h)anthracene, methylene chloride, N-nitrosodimethylamine, 1,2-diphenyl hydrazine, pentachlorophenol and tetrachloroethylene as recommended by the TSD for the achievement of water quality standards and for the protection of the beneficial uses of the receiving stream. Furthermore, for BOD<sub>5</sub>, TSS, pH, chlorine residual, and total coliform organisms, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. The rationale for using shorter averaging periods for these constituents is discussed in section IV.C.3. of this Fact Sheet.

For effluent limitations based on Secondary MCLs, this Order includes annual average effluent limitations. The Secondary MCLs are drinking water standards contained in Title 22 of the California Code of Regulations. Title 22 requires compliance with these standards on an annual average basis, when sampling at least quarterly. Since it is necessary to determine compliance on an annual average

basis, it is impracticable to calculate average weekly and average monthly effluent limitations.

### **Satisfaction of Anti-Backsliding Requirements**

The effluent limitations in this Order are at least as stringent as the effluent limitations in the existing Order, with the exception of effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. The effluent limitations for these pollutants are less stringent than those in Order No. 5-00-188. This relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations.

Order No. 5-00-188 included effluent limitations for chloroform, lindane, silver, lead, zinc and cyanide. Based on monitoring data collected from June 2005 – July 2008, the discharge does not indicate reasonable potential to exceed water quality objectives for chloroform, lindane, silver, lead and zinc. Therefore, effluent limitations for these parameters were not included in this Order. The lack of effluent limitations in this Order does not constitute backsliding.

Order No. 5-00-188 established effluent limitations for cyanide of 10.8 µg/L as a daily average with a trigger of 6.1 µg/L. The cyanide limitation of 10.8 µg/L was based on the MEC of 9.0 µg/L times a safety factor of 1.2 (which was proposed by the Discharger and accepted by the Central Valley Water Board). A trigger concentration exceedance results in an investigation and Central Valley Water Board notification with the Central Valley Water Board may require an action plan to address the cause of the exceedance. The Central Valley Water Board found that the trigger concentration would be protective and appropriate if established as the 95th percentile value assuming that historical data follows a lognormal probability distribution which was 6.1 mg/L. The Discharger performed a dynamic model for cyanide which resulted in a chronic LTA of 13.9 mg/L. The calculated limit is 11.0 mg/L as an AMEL with a MDEL of 22.0 mg/L. As discussed in Section IV.C.2.d, the dynamic model represents a more accurate picture of the mixing zone concentrations. This Order relaxes the effluent limitation for cyanide from Order No. 5-00-188. The dynamic model data submitted by the Discharger is considered new information by the Central Valley Water Board.

Order No. 5-00-188 established effluent limitations for oil and grease. As discussed further in section IV.C.3, monitoring data over the term of Order No. 5-00-188 indicated that the discharge no longer exhibits reasonable potential to exceed water quality objectives for oil and grease. Therefore, the effluent limitation is not retained in this Order. The monitoring data submitted by the Discharger is considered new information by the Central Valley Water Board.

The revision of the cyanide limitation and the removal of effluent limitations for oil and grease, chloroform, lindane, silver, lead and zinc are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Any impact on existing water quality will be insignificant.

#### 4. Satisfaction of Antidegradation Policy

This Order does not allow for an increase in flow or mass of pollutants to the receiving water with the exception of cyanide as discussed in section D.3 of the Fact Sheet. Antidegradation analyses were completed prior to adoption of the existing NPDES permits that grants a discharge capacity of 181 mgd. However, conditions in the Sacramento River and Delta downstream of the discharge have significantly changed since prior antidegradation analyses were conducted, so it is appropriate to conduct a new antidegradation analysis for the exiting discharge.

A complete antidegradation analysis “Antidegradation Analysis for Proposed Wastewater Treatment Plant discharge Modification” was submitted by the Discharger with the Report of Waste Discharge in February 2005. The Discharger’s antidegradation analysis was based on the incremental increase of the SRWTP capacity expansion from 181 mgd to 218 mgd. This antidegradation analysis was updated and revised based on the Central Valley Water Board staff’s comments and more recent water quality data in the Discharger’s “Antidegradation Analysis for Proposed Discharge Modification for the Sacramento Regional Wastewater Treatment Plant” dated 20 May 2009. Along with the 37 mgd increase in capacity, the antidegradation analysis also modeled the worst-case concentrations at the discharge of 181 mgd and for 154 mgd (baseline data for the EIR).

The Discharger’s Antidegradation Analysis (ADA) identified the constituents of concern and categorized them as Category 1, Category 2, and Category 3 pollutants (see Table X). Category 1 pollutants are of concern regionally and have potential impacts on the Delta ecosystem and its water quality. Category 2 pollutants are constituents that may cause localized impacts, but negligible impacts in far-field receiving waters. Category 3 pollutants are constituents that were detected in the discharge, but have no history of contributing adverse impacts in the Sacramento River.

The Discharger evaluated background river concentrations and effluent concentrations and determined which constituents were of concern for impacting beneficial uses or of concern by stakeholders. Those constituents were placed into three categories. The first category includes constituents that are of regional concern and could impact the beneficial uses both locally (near field) and in farther reaches of the Delta (far field). Those constituents are: ammonia, total nitrogen, nitrate plus nitrite, total Kjeldahl nitrogen (TKN), total phosphorus, electrical conductivity (EC), total dissolved solids (TDS), chloride, total organic carbon, mercury, and dissolved oxygen.

The second category includes constituents that may impact within 700 feet downstream of the diffuser or the near field. These constituents include: aluminum, cadmium, copper, zinc, total coliform organisms and temperature.

The third category includes constituents of concern that generally had no history of impacts to the Sacramento River. The constituents evaluated in the ADA are shown in Table F-19, below.

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The Near Field and Far Field models previously described were used to determine reasonable worst-case impacts on the receiving waters. In the ADA, the focus was on the incremental increase from an average dry weather discharge flow of 181 mgd to 218 mgd. However, due to a legal challenge of the Discharger's EIR and due to an overall slow down in the economy and growth in the Sacramento area, the Discharger withdrew its request for an expansion of discharge flow. Therefore, the information provided in the ADA was used by Central Valley Water Board staff to evaluate the impacts of the discharge at the permitted discharge flow of 181 mgd. For each pollutant the amount of reduced assimilative capacity was calculated to determine whether the increased pollutant loading was significant. Table F-19, below, summarizes the antidegradation impacts for the constituents of concern. The constituents with the largest impacts include ammonia, salinity (e.g., electrical conductivity, total dissolved solids, and chloride), copper, cyanide, bis(2-ethylhexyl)phthalate, bromodichloromethane, chloroform, and chlorpyrifos.

As shown in Table F-19, the existing permitted discharge is degrading the receiving water. Therefore, the Discharger must use best practicable treatment or control (BPTC) of the discharge in accordance with State Water Board Resolution 68-16. The Sacramento River and Sacramento-San Joaquin Delta are high quality waters of exceptional recreation, economical, and ecological significance to the people of the State of California. As discussed below, the Central Valley Water Board finds that in order to maintain and enhance the water quality of the Sacramento River and Sacramento-San Joaquin Delta, the Discharger must implement BPTC. For the following reasons, BPTC for this facility includes implementation of nitrification, denitrification, and the equivalent of Title 22 filtration with ultraviolet light or chlorine disinfection treatment.

- The Sacramento River and Sacramento-San Joaquin Delta at the vicinity of the outfall are home to at least nine state and federally protected threatened or endangered species<sup>1</sup>.
- The Sacramento River and Sacramento-San Joaquin Delta support a trillion dollar economy with \$27 billion economy for agriculture.<sup>2</sup>
- The Sacramento River and Sacramento-San Joaquin Delta provide drinking water to 25 million people of the State.<sup>3</sup>
- The Sacramento River and Sacramento-San Joaquin Delta support 12 million recreational user days per year, including 290 shoreline recreational areas, 300 marinas and half a million boaters.<sup>4</sup>
- Ammonia, along with BOD, from the SRWTP reduces the dissolved oxygen in the Sacramento River and Sacramento-San Joaquin Delta for nearly 40 miles

<sup>1</sup> Comment letter from USFWS to Kathy Harder dated 15 June 2010.

<sup>2</sup> [http://www.delta.ca.gov/res/docs/Sacto-SanJoaquin\\_fact.pdf](http://www.delta.ca.gov/res/docs/Sacto-SanJoaquin_fact.pdf)

<sup>3</sup> Id.

<sup>4</sup> Id.

below its discharge<sup>1</sup>. The oxygen depleting constituents from the SRWTP use or will use all the assimilative capacity of the River and Delta leaving no assimilative capacity available to other communities that currently reduce oxygen demanding constituents by implementing advanced treatment processes.

- The ammonia from the SRWTP contributes to the water quality problems in the Suisun Bay<sup>2</sup>.
- The ammonia from the SRWTP may be acutely or chronically toxic to species, including copepods<sup>3</sup> and freshwater mussels that reside in the Sacramento River and Sacramento-San Joaquin Delta.
- Ammonia in the SRWTP effluent combined with chlorine disinfection creates nitrosoamines at levels 100 times greater than the primary MCL. Nitrosoamines are highly mutagenic and potentially carcinogenic.
- At times the risk of illness or infection from pathogenic protozoans nearly quadruples between upstream and downstream of the SRWTP discharge<sup>4</sup>.
- Filtration of disinfected SRWTP effluent will result in reduction of total organic carbon, copper, mercury, phosphorus, TSS, BOD<sub>5</sub> and possibly Constituents of Emerging Concern (CECs)<sup>5</sup>.
- Reduction or elimination of ammonia, nitrate and protozoans will reduce impacts to the beneficial uses of the Sacramento River and Sacramento-San Joaquin Delta from the SRWTP discharge.
- Other existing wastewater treatment plants that discharge directly or indirectly to the Sacramento River and Sacramento-San Joaquin Delta are or will be implementing advanced treatment processes to reduce or eliminate ammonia, nitrate and pathogens.
- The costs per capita to implement advanced treatment processes at other POTWs are similar to the projected costs per capita for advanced treatment at the SRWTP. Project costs can vary greatly depending on how much existing treatment facilities can be incorporated into the advanced treatment process. In some cases, the cost is for a new treatment facility, differing treatment processes and/or the costs are based on construction completed several years ago.

<sup>1</sup> Memorandum from Mitchell J. Mysliwiec (LWA) to Bob Seyfried, SRCSD "Response to Tetra Tech Comments on the LDOPA", 26 August 2010.

<sup>2</sup> Letter from Bruce Wolfe, SFRWQCB to Kathy Harder, dated 4 June 2010.

<sup>3</sup> Swee Teh, Presentation at Contaminants Workshop, July 6, 2010

<sup>4</sup> Gerba, Charles P., "Estimated Risk of Illness from Swimming in the Sacramento River", 23 February 2010.

<sup>5</sup> Technical Memorandum: Analysis of Costs and Benefits of Advanced Treatment Alternatives for the Sacramento Regional Wastewater Treatment Plant, LWA, May 2010.

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**Table F-18. Per Capita Costs for Tertiary Upgrades<sup>1</sup>**

Discharger	Population (July 2008) <small>www.city-data.com</small>	Tertiary Conversion Cost	Approximate per capita cost (\$)
Ironhouse Sanitary District	30,000	\$54,500,000	\$1,800
City of Roseville – Dry Creek WWTP	56,330	\$95,000,000	\$1,700
City of Roseville – Pleasant Grove WWTP	56,330	\$120,000,000	\$2,100
City of Davis	62,593	\$140,000,000	\$2,200
City of Manteca	65,028	\$22,800,000	\$350
City of Lodi	61,301	\$60,000,000	\$1000
City of Woodland	54,567	\$17,000,000	\$300
City of Tracy	79,196	\$40,000,000	\$500
City of Vacaville	92,219	\$150,000,000	\$1,600
Sacramento Regional County Sanitation District	1,300,000	\$2,066,000,000	\$1,600

This Order requires compliance with applicable federal technology-based standards and with WQBELs where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards. The permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16. Compliance with these requirements will result in the use of best practicable treatment or control of the discharge.

**Table F-19. Antidegradation Analysis**

Constituent	Units	Mean Effluent Conc. <sup>1</sup>	Mean R-1 Conc. <sup>1</sup>	Median 181 mgd Conc @ Hood <sup>2</sup>	Mean 181 mgd Conc @ 700 ft <sup>2</sup>	Applicable Water Quality Objective	Percent Assimilative Capacity Used
<b>Category 1 Pollutants</b>							
Ammonia (summer)	mg/L	24	0.1	0.25	0.64	1.55-6.7	2.3%-10.3%
Ammonia (winter)	mg/L	24	0.1	0.31	0.85	1.55-6.7	3.2%-14.5%
Total Nitrogen (summer)	mg/L	24	0.39	0.64	0.94	--	--
Total Nitrogen (winter)	mg/L	24	0.39	0.7	1.15	--	--
Nitrate plus nitrite	mg/L	0.13	0.16	0.12	0.16	10	0.0%
TKN	mg/L	26	0.35	0.57	0.95	--	--
Total Phosphorus	mg/L	2.34	0.11	0.08	0.18	--	--
EC	µmhos/cm	764	163	157	182	700	3.5%
TDS	mg/L	410	98	--	108	450	2.8%

<sup>1</sup> Telephone Survey by Elizabeth Lee, CVWQCB

Constituent	Units	Mean Effluent Conc. <sup>1</sup>	Mean R-1 Conc. <sup>1</sup>	Median 181 mgd Conc @ Hood <sup>2</sup>	Mean 181 mgd Conc @ 700 ft <sup>2</sup>	Applicable Water Quality Objective	Percent Assimilative Capacity Used
Chloride	mg/L	91	5.1	5.7	7.81	106	2.7%
TOC	mg/L	17.5	2.34	2.3	2.82	--	--
Mercury	ng/L	4.1	5.6		5.54	--	--
<b>Category 2 Pollutants</b>							
Aluminum	µg/L	23.3	969	--	327.3	200	--
Cadmium	µg/L	0.023	0.0081	--	0.009	1.5	0.1%
Copper	µg/L	4.31	1.47	--	1.56	5.62	2.2%
Zinc	µg/L	21.2	0.57	--	1.22	74.5	0.9%
Temperature		23	15.5	--	--	--	--
Total Coliform		7.8	1983	--	--	--	--
<b>Category 3 Pollutants</b>							
Antimony	µg/L	0.32	0.066	--	0.074	6	0.1%
Arsenic	µg/L	1.64	1.35	--	1.36	10	0.1%
Chromium	µg/L	0.69	0.15	--	0.176	--	--
Lead	µg/L	0.25	0.03	--	0.037	1.38	0.5%
Molybdenum	µg/L	2.83	0.51	--	0.584	10	0.8%
Nickel	µg/L	2.37	0.67	--	0.72	32.8	0.2%
Selenium	µg/L	0.79	0.21	--	0.23	5	0.4%
Silver	µg/L	0.063	0.014	--	0.016	1.35	0.1%
BOD	mg/L	7.59	2.13	--	--	--	--
Manganese	µg/L	64.2	3.7	--	--	50	--
Cyanide	µg/L	5.12	3.92	--	3.95	5.2	2.3%
TSS	mg/L	6.68	29.4	--	28.6	--	--
1,4-Dichlorobenzene	µg/L	0.68	0.27	--	0.28	5	0.2%
Bis(2-ethylhexyl)phthalate	µg/L	2.6	0.11	--	0.19	1.8	4.7%
Bromodichloromethane	µg/L	0.95	0.37	--	0.39	0.56	10.5%
Chloroethane	µg/L	0.28	0.42	--	0.42	75	0.0%
Chloroform	µg/L	15	0.93	--	1.38	80	0.6%
Diethyl Phthalate	µg/L	1.46	0.047	--	0.095	23000	0.0%
Di-n-butyl Phthalate	µg/L	1.35	0.072	--	0.21	2700	0.0%
Methyl Chloride	µg/L	0.73	0.47	--	0.48	3	0.4%
Methylene Chloride	µg/L	1	0.69	--	0.7	4.7	0.2%
Tetrachloroethylene	µg/L	0.13	0.38	--	0.37	0.8	--
Toluene	µg/L	0.25	0.36	--	0.36	150	0.0%
Chlorpyrifos	µg/L	0.015	0.006	--	0.01	0.015	44.4%
Dibromochloromethane	µg/L	0.14	0.42	--	--	0.41	--
n-Nitrosodimethylamine	µg/L	0.72	2.69	--	--	0.00069	--

<sup>1</sup> Table 5-2, "Antidegradation Analysis for Proposed Discharge Modification for the Sacramento Regional Wastewater Treatment Plant" 20 May 2009

<sup>2</sup> Chapter 5, *ibid.* The constituent concentrations at Hood are representative of the completely mixed conditions, whereas, the constituent concentrations at 700 feet downstream of the outfall is representative of the average concentration of the plume.

## 5. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based effluent limitations and WQBELs for individual pollutants. The technology-based effluent limitations consist of restrictions on flow and percent removal requirements for BOD<sub>5</sub> and TSS. The WQBELs consist of restrictions on ammonia, copper, cyanide, chlorpyrifos, aluminum, carbon tetrachloride, dichlorobromomethane, chlorodibromomethane, bis(2-ethylhexyl) phthalate, methylene chloride, tetrachlorethylene, pentachlorophenol, dibenzo(ah)anthracene, 1,2-diphenyl-hydrazine, N-nitrosodimethylamine, manganese, methyl-tertiary-butyl-ether, nitrite, nitrate, chlorine residual, settleable solids, mercury and electrical conductivity. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order includes new effluent limitations for BOD<sub>5</sub>, total coliform and TSS to meet numeric objectives or protect beneficial uses. The rationale for including these limitations is explained in the Fact Sheet. In addition, the Regional Water Board has considered the factors in CWC section 13241 in establishing these requirements.

WQBELs have been scientifically derived to implement water quality objectives that protect beneficial uses. Both the beneficial uses and the water quality objectives have been approved pursuant to federal law and are the applicable federal water quality standards. To the extent that toxic pollutant WQBELs were derived from the CTR, the CTR is the applicable standard pursuant to 40 CFR 131.38. The scientific procedures for calculating the individual WQBELs for priority pollutants are based on the CTR-SIP, which was approved by USEPA on 18 May 2000. All beneficial uses and water quality objectives contained in the Basin Plan were approved under state law and submitted to and approved by USEPA prior to 30 May 2000. Any water quality objectives and beneficial uses submitted to USEPA prior to 30 May 2000, but not approved by USEPA before that date, are nonetheless "applicable water quality standards for purposes of the CWA" pursuant to 40 CFR 131.21(c)(1). Collectively, this Order's restrictions on individual pollutants are no more stringent than required to implement the requirements of the CWA.

This Order contains pollutant restrictions that are more stringent than applicable federal requirements and standards. Specifically, this Order includes effluent limitations for BOD<sub>5</sub> and TSS that are more stringent than applicable federal standards, but that are nonetheless necessary to meet numeric objectives or protect beneficial uses. The rationale for including these limitations is explained in section IV.C.3 of this Fact Sheet.

## 6. Performance-based Effluent Limitations.

Performance-based effluent limitations have been used in this Order to establish interim effluent limitations and final effluent limitations where the calculated WQBEL (w/dilution credit) results in effluent limitations that exceed facility performance. Table F-20, below, displays the information used in developing the performance-

based effluent limitations and the procedures for calculating performance-based effluent limitations are discussed below.

In developing the performance-based effluent limitation, where there are 10 sampling data points or more, sampling and laboratory variability is accounted for by establishing interim limits that are based on normally distributed data where 99.9% of the data points will lie within 3.3 standard deviations of the mean (Basic Statistical Methods for Engineers and Scientists, Kennedy and Neville, Harper and Row). Therefore, the interim limitations in this Order are established as the mean plus 3.3 standard deviations of the available data. However, if the maximum effluent concentration (MEC) exceeds the mean plus 3.3 standard deviation, then the MEC is the used for the interim limitation. When there are less than 10 sampling data points available, the EPA *Technical Support Document for Water Quality-based Toxics Control* ((EPA/505/2-90-001), TSD) recommends a coefficient of variation of 0.6 be utilized as representative of wastewater effluent sampling. The TSD recognizes that a minimum of 10 data points is necessary to conduct a valid statistical analysis. The multipliers contained in Table 5-2 of the TSD are used to determine a maximum daily limitation based on a long-term average objective. In this case, the long-term average objective is to maintain, at a minimum, the current plant performance level. Therefore, when there are less than 10 sampling points for a constituent, interim limitations are based on 3.11 times the maximum observed effluent concentration to obtain the daily maximum interim limitation (TSD, Table 5 2).

Where a dataset includes data reported below the laboratory detection limits (non-detects) the statistics, described above, becomes uncertain. In these situations, the regression on order statistics (ROS) technique was used to develop summary statistics and probability distribution functions. The ROS method was chosen that numerous studies have found that substituting one-half the reporting limit “results in substantial bias unless the proportion of missing data is small, 10 percent or less”<sup>1</sup>. This technique is often used with water quality data and is a useful tool for evaluating data sets with at least 40% detected data<sup>2</sup>. Furthermore, the ROS method was chosen because imputation methods, such as ROS, depend less on assumptions of distributional shape than the maximum likelihood estimation (MLE) method<sup>3</sup>. The ROS technique develops probability plotting positions for each detected and non-detect data point based on the ordering of all data. A least squares line is fit by regressing the log transformed concentrations to the detected probability plotting positions. Fill-in concentrations are assigned to the non-detect data points for calculation of summary statistics based on the detected data probability plotting positions and the ordered statistics regression line equation. The

<sup>1</sup> Dennis R. Helsel, “More Than Obvious: Better Methods for Interpreting Nondetect Data,” *Environmental Science and Technology* (15 October 2005): 419A

<sup>2</sup> Robert H. Shumway, Rahman S. Azari, and Masoud Kayhanian, “Statistical Approaches to Estimating Mean Water Quality Concentrations with Detection Limits,” *Environmental Science and Technology* 36, no. 15 (2002): 3345-3353.

<sup>3</sup> Dennis R. Helsel, “More Than Obvious: Better Methods for Interpreting Nondetect Data,” *Environmental Science and Technology* (15 October 2005): 420A

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summary statistics are calculated from the detected data points and the fill-in values for non-detect data. An estimated mean and standard deviation are used to calculate the 99.9<sup>th</sup> percentile performance-based effluent limitation, as described above.

**Table F-20. Performance-based Effluent Limitations Statistics**

Parameter	MEC	# of Samples	% Detected	Mean	Std. Dev.	Performance-based Effluent Limitation
Ammonia <sup>1,2</sup>	45	513	100	24.2	3.70	45
Copper	6.34	114	100	4.16	0.803	6.8
Cyanide <sup>3</sup>	10	176	58.5	4.85	1.89	11.1
Chlorpyrifos <sup>4</sup>	0.039	73	16.4	--	--	0.12
Aluminum <sup>3</sup>	35.2	61	93.4	17.6	5.39	35.4
Carbon Tetrachloride <sup>4</sup>	1.7	101	5.9	--	--	5.3
Dibromochloromethane <sup>4</sup>	0.7	101	16.8	--	--	2.2
Bromodichloromethane	3.4	101	91.1	1.10	0.583	3.4
Bis(2-ethylhexyl) phthalate <sup>5</sup>	8.1	115	99.1	0.854	0.506	12.5
Methylene Chloride <sup>1,3</sup>	5.4	101	91.1	1.18	0.901	5.4
Tetrachloroethylene <sup>4</sup>	1.4	101	13.9	--	--	4.4
Pentachlorophenol <sup>4</sup>	5.7	115	0.9	--	--	17.7
Dibenzo(ah)anthracene <sup>4</sup>	0.51	145	0.7	--	--	1.6
1,2-Diphenyl-hydrazine <sup>4</sup>	2.8	114	1.8	--	--	8.7
n-Nitrosodimethylamine <sup>4</sup>	0.082	125	16.8	--	--	0.26
Manganese <sup>5,6</sup>	82	34	100	4.16	0.0869	85.3
Methyl Tertiary Butyl Ether <sup>4</sup> (MTBE)	5.8	128	2.3	--	--	18.0

Note: Data set are based on data collected between 12 June 2005 and 10 October 2009 unless noted.

- 1 Performance-based effluent limitation set to MEC.
- 2 Data set ranges from 15 June 2005 to 28 April 2010.
- 3 Regression on order statistics (ROS) method used.
- 4 Performance-based effluent limit estimated as 3.11 times the MEC because the amount of detected data is less than 20%
- 5 Mean and standard deviation are expressed as natural logarithms because the log-normal distribution is the best fit for the dataset.
- 6 Data set ranges from 19 April 2009 to 4 June 2009.
- 7 Data set ranges from 11 June 2005 to 8 October 2008.
- 8 Data set ranges from 5 June 2005 to 6 October 2009.

## E. Interim Effluent Limitations

1. **Compliance Schedules for Ammonia, chlorpyrifos and Title 22 (or Equivalent) Requirements.** The permit limitations for ammonia, chlorpyrifos, and BOD<sup>5</sup>, TSS and total coliform organisms are more stringent than the limitations previously imposed. These new limitations are based on effluent sampling and the California Department of Public Health's recommendations.

The establishment of Title 22 (or equivalent), ammonia and chlorpyrifos requirements has not been previously required for this discharge. This Order

requires the Discharger to meet Title 22 (or equivalent), ammonia and chlorpyrifos requirements for all flows, which represents a newly interpreted water quality objective that results in a permit limitation more stringent than the limitation previously imposed.

The Discharger has complied with the application requirements in paragraph 4 of the State Water Board's Compliance Schedule Policy, and the Discharger's application demonstrates the need for additional time to implement actions to comply with the new limitations, as described below. Based on the sample results for the effluent, it appears that the Discharger may be in immediate non-compliance with effluent limitations for ammonia, chlorpyrifos, BOD<sub>5</sub>, TSS and total coliform organisms upon issuance of the permit. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. The Basin Plan for the Sacramento and San Joaquin River Basins includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives adopted after 25 September 1995 (see Basin Plan at page IV-16). The WQBELs for ammonia, chlorpyrifos, BOD<sub>5</sub>, TSS and total coliform organisms are based on a new interpretation of the narrative standard for protection of receiving water beneficial uses. Therefore, a compliance schedule for compliance with the effluent limitations for ammonia, BOD<sub>5</sub>, TSS and total coliform organisms is established in the Order.

- a. **Demonstration that the Discharger needs time to implement actions to comply with a more stringent permit limitation specified to implement a new, revised, or newly interpreted water quality objective or criterion in a water quality standard.** Table 2.2 of the Infeasibility Report identifies constituents with the potential to exceed effluent limitations in the proposed NPDES Permit based on monitoring data collected between June 2005 and July 2008, including ammonia, chlorpyrifos, BOD<sub>5</sub>, total coliform organisms, and TSS. The Discharger states that the requested compliance schedules are driven primarily by the need to construct treatment plant upgrades.
- b. **Diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts.** The Infeasibility Report states that the Discharger has pretreatment program that regulates industrial discharges and an active source control program. The discharger issues permits to significant and non-significant users which require monitoring of pollutants of concern and implementation of limits where deemed necessary to control a point source. Table 2-3 of the Infeasibility Report identifies 33 categorical industrial users, 27 significant industrial users and 306 non-significant users. Potential sources of ammonia, chlorpyrifos, BOD<sub>5</sub>, TSS and total coliform organisms include domestic and non-domestic sources.
- c. **Source control efforts are currently underway or completed, including compliance with any pollution prevention programs that have been**

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- established.** The Discharger has active source reduction programs targeting mercury, pesticides (including chlorpyrifos, diazinon and lindane) and waste medications.
- d. **A proposed schedule for additional source control measures or waste treatment.** Table 2-4 of the Infeasibility Report provided a proposed compliance schedules, which includes source control for chlorpyrifos with achieving compliance with final effluent limits 6 years after the permit effective date. For ammonia pilot testing, design of improvements and construction to be achieved 10 years from the permit effective date and full compliance with effluent limitations by 1 December 2020. For BOD<sub>5</sub>, TSS and total coliform organisms, pilot testing, design and construction to be achieved 9 years from the permit effective date and full compliance with effluent limitations by 1 December 2019.
- e. **Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim permit effluent limit to apply if a schedule of compliance is granted.** Interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The Discharger can consistently comply with the effluent limitations for BOD<sub>5</sub>, total coliform organisms, and TSS required by Order No. 5-00-188. Therefore, the proposed NPDES Permit requires compliance with interim effluent limitations based on the effluent limitations required by Order No. 5-00-188. There are no existing permit effluent limitations for ammonia and chlorpyrifos, so the interim limits have been calculated based on facility performance (see Table F-20).
- f. **The highest discharge quality that can reasonably be achieved until final compliance is attained.** Compliance with the interim effluent limitations will ensure that the Discharger maintains the discharge at levels that can reasonably be achieved until final compliance is attained.
- g. **The proposed compliance schedule is as short as possible,** given the type of facilities being constructed or programs being implemented, and industry experience with the time typically required to construct similar facilities or implement similar programs. The Discharger determined in the Infeasibility Report that the compliance schedule is as short as possible. The estimated durations for each task and estimated completion dates were included in Table 2-4 of the Infeasibility Report. Interim performance-based MDELs have been established in this Order. The interim limitations were determined as described in section IV.XX, above, and are in effect through 1 December 2020 until the final limitations take effect. As part of the compliance schedule, this Order requires the Discharger to submit a corrective action plan and implementation schedule to assure compliance with the final effluent limitations for ammonia, chlorpyrifos, BOD<sub>5</sub>, TSS and total coliform organisms. In addition, the Discharger shall update prepare and implement the existing a pollution prevention plan that is in compliance with CWC section 13263.3(d)(3). The interim numeric effluent

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limitations and source control measures will result in the highest discharge quality that can reasonably be achieved until final compliance is attained.

## **2. Interim Limitations for Ammonia, chlorpyrifos and Title 22 (or Equivalent)**

**Requirements.** The SIP, section 2.2.1, The Compliance Schedule Policy requires that if a compliance schedule is granted for a CTR or NTR constituent, the Central Valley Water Board shall to establish interim requirements and dates for their achievement in the NPDES permit. Interim numeric effluent limitations are required for compliance schedules longer than 1 year. The interim effluent limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The State Water Board has held that the SIP may be used as guidance for non-CTR constituents. Therefore, the SIP requirement for interim effluent limitations has been applied to both CTR and non-CTR constituents in this Order.

The interim limitations for ammonia and chlorpyrifos in this Order are based on the current treatment plant performance and were developed as discussed in section IV.D.6, above.

Interim limitations for Title 22 (or equivalent) requirements (i.e., for BOD<sub>5</sub>, total coliform organisms, and TSS) are established at the levels recommended by DPH for secondary treatment-level disinfection.

The Central Valley Water Board finds that the Discharger can undertake source control and treatment plant measures to maintain compliance with the interim limitations included in this Order. Interim limitations are established when compliance with final effluent limitations cannot be achieved by the existing discharge. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim limitations, however, establish an enforceable ceiling concentration until compliance with the effluent limitation can be achieved. The limited, short-term degradation associated with the compliance schedule is consistent with State and federal policies and is authorized by 40 CFR 122.47 and the Compliance Schedule Policy.

## **F. Land Discharge Specifications – Not Applicable**

## **G. Reclamation Specifications – Not Applicable**

Treated wastewater discharged for reclamation is regulated under separate waste discharge requirements and must meet the requirements of CCR, Title 22.

## **V. RATIONALE FOR RECEIVING WATER LIMITATIONS**

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that

surface water and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the maximum contaminant levels (MCLs) in Title 22, CCR. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

## **A. Surface Water**

1. CWA section 303(a-c), requires states to adopt water quality standards, including criteria where they are necessary to protect beneficial uses. The Central Valley Water Board adopted water quality criteria as water quality objectives in the Basin Plan. The Basin Plan states that “[t]he *numerical and narrative water quality objectives define the least stringent standards that the Regional Water Board will apply to regional waters in order to protect the beneficial uses.*” The Basin Plan includes numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains receiving surface water limitations based on the Basin Plan numerical and narrative water quality objectives for bacteria, biostimulatory substances, color, chemical constituents, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, suspended sediment, settleable substances, suspended material, tastes and odors, temperature, toxicity, and turbidity.

## **B. Groundwater**

1. The beneficial uses of the underlying ground water are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.
2. Basin Plan water quality objectives include narrative objectives for chemical constituents, tastes and odors, and toxicity of groundwater. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use. The tastes and odors objective prohibits taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan also establishes numerical water quality objectives for chemical constituents and radioactivity in groundwaters designated as municipal supply. These include, at a minimum, compliance with MCLs in Title 22 of the CCR. The bacteria objective prohibits coliform organisms at or above 2.2 MPN/100 mL. The Basin Plan requires the application of the most stringent objective necessary to ensure that waters do

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not contain chemical constituents, toxic substances, radionuclides, taste- or odor-producing substances, or bacteria in concentrations that adversely affect municipal or domestic supply, agricultural supply, industrial supply or some other beneficial use.

## VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

40 CFR 122.48 requires that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 authorizes the Central Valley Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (Attachment E) of this Order, establishes monitoring and reporting requirements to implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program for the Facility.

### A. Influent Monitoring

1. Influent monitoring is required to collect data on the characteristics of the wastewater and to assess compliance with effluent limitations (e.g., BOD5 and TSS reduction requirements). The monitoring frequencies for flow (continuous), BOD5 and Total Suspended Solids once per day) have been retained from Order No. 5-00-188. In addition, pH (continuous), electrical conductivity (once per day) and total dissolved solids (once per day) are monitored for a more complete characterization of the influent.
2. Influent monitoring is required to collect data on the characteristics of the Groundwater Corrective Action Program (CAP) Discharge Monitoring. The monitoring frequencies for flow (once per month), priority pollutants, total dissolved solids, electrical conductivity and nitrates (twice per year) have been retained from Order No. 5-00-188. .

### B. Effluent Monitoring

1. Pursuant to the requirements of 40 CFR 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the treatment process, and to assess the impacts of the discharge on the receiving stream and groundwater.
2. Effluent monitoring frequencies and sample types for flow, chlorine residual, sulfur dioxide, temperature, pH, BOD, TSS, total coliforms, ammonia, settleable solids, electrical conductivity, total dissolved solids, total organic carbon, cyanide, arsenic, mercury, copper, silver, methylene chloride, lead, tetrachloroethylene, bis(2-ethylhexyl) phthalate, chlorodibromomethane, dichlorobromomethane, carbon tetrachloride, MTBE, hardness, alkalinity, standard minerals, and priority pollutants have been retained from Order No. 5-00-188 to determine compliance with effluent limitations for these parameters.

3. Monitoring data collected over the existing permit term for lindane, lead, zinc, silver and arsenic did not demonstrate reasonable potential to exceed water quality objectives/criteria. Thus, specific monitoring requirements for these parameters have not been retained from Order No. 5-00-188.
4. This Order specifies lower reporting limits sufficient for comparison with the applicable water quality objectives as follows:

Pentachlorophenol	µg/L	EPA method 625 w/ MDL 0.05 µg/L
Dibenzo(a,h)anthracene	µg/L	EPA method 625 w/MDL 0.001-0.005 µg/L
1,2-Diphenyl-hydrazine	µg/L	EPA method 625 w/ MDL 0.58 µg/L
N-nitrosodimethylamine	ng/L	EPA Method 521
Chlorpyrifos	µg/L	EPA Method 625M; Method 8141 or equivalent
Diazinon	µg/L	EPA Method 625M; Method 8141 or equivalent
Perchlorate	µg/L	SW-846 Method 6850

5. In addition to priority pollutant data for the effluent, non-priority pollutants also need to be monitored to conduct a meaningful reasonable potential analysis. Similar to priority pollutant monitoring, periodic monitoring for non-priority pollutants is needed to provide the data necessary for determining the reasonable potential for those pollutants for which no WQBELs were established. Thus, monitoring for non-priority pollutants include pyrethroids, nitrosoamines, dioxin and congeners, furans, persistent chlorinated hydrocarbon pesticides and other constituents of concern as described in Table E-4.
6. In order to determine compliance with the effluent limitations, aluminum, methylmercury, manganese, pentachlorophenol, dibenzo(ah)anthracene, 1,2-diphenyl-hydrazine, chlorpyrifos and N-nitrosodimethylamine are include in the effluent monitoring at minimum frequencies .
7. In addition to the constituents addressed above, perchlorate in the effluent may have reasonable potential to impact municipal beneficial uses. Perchlorate was detected in the effluent 11 out of 81 samples above the water quality criteria, however, the analytical method was not appropriate for wastewater and could give false positive detections due to salt interferences. Therefore, to determine if perchlorate has reasonable potential monthly analysis with SW-846 Method 6850 is required.

8. The California Department of Public Health (DPH) recommends a 1 in 10,000 risk and a 1 log removal of *cryptosporidium* and *giardia*. Therefore, weekly monitoring for these pathogenic protozoans is required to meet the recommendations.
9. Timing, duration and purpose of wastewater diversions, effluent or influent, is a measure of proper operation of the wastewater treatment plant and is required to be reported on a monthly basis.

### C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity.** Flow through 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity. The test species have changed from fathead minnow (*Pimephales promela*) to rainbow trout (*Oncorhynchus mykiss*) because rainbow trout are salmonids similar to resident species and are more sensitive than fathead minnows to wastewater effluent. Using fathead minnows may underestimate effluent toxicity. In addition to rainbow trout, *Hyalella azteca*, an amphipod is a resident species in the Sacramento-San Joaquin Delta and is an appropriate indicator organism for detecting pyrethroid toxicity<sup>1</sup>. Pyrethroid toxicity is a concern in the Sacramento-San Joaquin Delta.
2. **Chronic Toxicity.** Monthly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective. Order No. 5-00-188 included chronic toxicity testing quarterly, the TSD recommends monthly chronic toxicity testing for major wastewater treatment facilities.

### D. Receiving Water Monitoring

#### 1. Surface Water

Receiving water monitoring is necessary to assess compliance with receiving water limitations and to assess the impacts of the discharge on the receiving stream.

#### 2. Groundwater

- a. CWC section 13267 states, in part, "(a) A Regional Water Board, in establishing...waste discharge requirements... may investigate the quality of any waters of the state within its region" and "(b) (1) In conducting an investigation..., the Regional Water Board may require that any person who... discharges... waste...that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Water Board requires. The burden, including costs, of

<sup>1</sup> Werner, I "Pelagic Organism Decline (POD): Acute and Chronic Invertebrate and Fish Toxicity Testing in the Sacramento-San Joaquin Delta", July 24, 2010

*these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports.”* The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the Regional Water Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports. The Monitoring and Reporting Program is issued pursuant to CWC section 13267. The groundwater monitoring and reporting program required by this Order and the Monitoring and Reporting Program are necessary to assure compliance with these waste discharge requirements. The Discharger is responsible for the discharges of waste at the facility subject to this Order.

- b.** Monitoring of the groundwater must be conducted to determine if the discharge has caused an increase in constituent concentrations, when compared to background. The monitoring must, at a minimum, require a complete assessment of groundwater impacts including the vertical and lateral extent of degradation, an assessment of all wastewater-related constituents which may have migrated to groundwater, an analysis of whether additional or different methods of treatment or control of the discharge are necessary to provide best practicable treatment or control to comply with Resolution No. 68-16. Economic analysis is only one of many factors considered in determining best practicable treatment or control. If monitoring indicates that the discharge has incrementally increased constituent concentrations in groundwater above background, this permit may be reopened and modified. Until groundwater monitoring is sufficient, this Order contains Groundwater Limitations that allow groundwater quality to be degraded for certain constituents when compared to background groundwater quality, but not to exceed water quality objectives. If groundwater quality has been degraded by the discharge, the incremental change in pollutant concentration (when compared with background) may not be increased. If groundwater quality has been or may be degraded by the discharge, this Order may be reopened and specific numeric limitations established consistent with Resolution No. 68-16 and the Basin Plan.
- c.** This Order requires the Discharger to continue groundwater monitoring and includes a regular schedule of groundwater monitoring in the attached Monitoring and Reporting Program. The groundwater monitoring reports are necessary to evaluate impacts to waters of the State to assure protection of beneficial uses and compliance with Central Valley Water Board plans and policies, including Resolution No. 68-16. Evidence in the record includes effluent monitoring data that indicates the presence of constituents that may degrade groundwater and surface water.

## **E. Other Monitoring Requirements**

### **1. Biosolids Monitoring**

Biosolids monitoring is required to ensure compliance with the biosolids disposal requirements contained in the Special Provision contained in section VI.C.6.a. of this Order. Biosolids disposal requirements are imposed pursuant to 40 CFR Part 503 to protect public health and prevent groundwater degradation.

### **2. Water Supply Monitoring**

Water supply monitoring is required to evaluate the source of constituents in the wastewater.

## **VII. RATIONALE FOR PROVISIONS**

### **A. Standard Provisions**

Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under 40 CFR 122.42.

40 CFR 122.41(a)(1) and (b) through (n) establish conditions that apply to all State-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 CFR 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with 40 CFR 123.25, this Order omits federal conditions that address enforcement authority specified in 40 CFR 122.41(j)(5) and (k)(2) because the enforcement authority under the CWC is more stringent. In lieu of these conditions, this Order incorporates by reference CWC section 13387(e).

### **B. Special Provisions**

#### **1. Reopener Provisions**

- a. Temperature Study.** There are uncertainties that the discharge may impact aquatic life in the vicinity of the discharge at the existing thermal exemption conditions. This Order requires the Discharger to complete a study of temperature's potential effect in the receiving water. This reopener provision allows the Central Valley Water Board to reopen this Order for modification of effluent limitations and receiving water limitations and requirements for temperature if after review of the study results it is determined that the discharge impacts beneficial uses.



- b. Pollution Prevention.** This Order requires the Discharger prepare pollution prevention plans following CWC section 13263.3(d)(3) for salinity. This reopener provision allows the Central Valley Water Board to reopen this Order for addition and/or modification of effluent limitations and requirements for these constituents based on a review of the pollution prevention plans.
- c. Whole Effluent Toxicity.** This Order requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity through a Toxicity Reduction Evaluation (TRE). This Order may be reopened to include a numeric chronic toxicity limitation, a new acute toxicity limitation, and/or a limitation for a specific toxicant identified in the TRE. Additionally, if a numeric chronic toxicity water quality objective is adopted by the State Water Board, this Order may be reopened to include a numeric chronic toxicity limitation based on that objective.
- d. Water Effects Ratio (WER) and Metal Translators.** A default WER of 1.0 has been used in this Order for calculating CTR criteria for applicable priority pollutant inorganic constituents. In addition, default dissolved-to-total metal translators have been used to convert water quality objectives from dissolved to total recoverable when developing effluent limitations for copper. If the Discharger performs studies to determine site-specific WERs and/or site-specific dissolved-to-total metal translators, this Order may be reopened to modify the effluent limitations for the applicable inorganic constituents.
- e. Perchlorate Study.** There are indications that the discharge may contain constituents that have a reasonable potential to cause or contribute to an exceedance of water quality objectives. This Order requires the Discharger to complete a study of these constituents' potential effect in the receiving water. This reopener provision allows the Central Valley Water Board to reopen this Order for addition of effluent limitations and requirements for these constituents if after review of the study results it is determined that the discharge has reasonable potential to cause or contribute to an exceedance of a water quality objective.
- f. Central Valley Drinking Water Policy.** If water quality objectives are adopted for organic carbon, nutrients, salinity, bromide, or pathogens to protect drinking water supplies in the Central Valley Region, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate, to require compliance with the applicable water quality objectives.
- g. Ammonia Studies.** The ammonia effluent limitations in this Order are based on USEPA's recommended National Ambient Water Quality Criteria for protection of freshwater aquatic life. However, studies are ongoing to evaluate the effect of ammonia on the inhibition of growth of freshwater diatoms in the Delta, as well as, studies to evaluate the sensitivity of delta smelt to ammonia toxicity and EPA proposed water quality criteria for freshwater mussels. Based on the result of

these or other studies, this Order may be reopened to modify the ammonia effluent limitations, as appropriate.

- h. *Hyalella azteca* Study.** There are indications that the discharge may contain constituents that are toxic to native species at very low levels.<sup>1</sup> *Hyalella azteca* is a native species in the Sacramento-San Joaquin Delta, it is sensitive to pyrethroids and it is an interface organism between sediment and the water column. Although testing with *Hyalella azteca* is not commonly used for wastewater effluent, it is a common species for determining toxicity in the Delta. Researchers are using a modified version of Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, USEPA Method #600-R-99-064. A study is needed to determine if a 4 or 10 water column test for growth or 10 day survival or both growth and survival is best for determining toxicity.
- i. Regional Monitoring Program.** The State and Regional Water Boards are committed to creation of a coordinated Regional Monitoring Program to address receiving water monitoring in the Delta for all Water Board regulatory and research programs. When a Regional Monitoring Program becomes functional, this permit may be reopened to make appropriate adjustments in permit-specific monitoring to coordinate with the Regional Monitoring Program.”
- j. The Bay-Delta Plan.** The South Delta salinity standards are currently under review by the State Water Board in accordance with implementation provisions contained in the Bay-Delta Water Quality Control Plan. This review in process includes an updated independent scientific investigation of irrigation salinity needs in the southern Delta. If applicable water quality objectives of the Bay-Delta Plan are adopted, this Order may be reopened for addition and/or modification of effluent limitations and requirements, as appropriate.

## 2. Special Studies and Additional Monitoring Requirements

- a. Chronic Whole Effluent Toxicity Requirements.** The Basin Plan contains a narrative toxicity objective that states, “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at page III-8.00). The discharge may contain chronic WET that has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan’s narrative toxicity objective.

This provision requires the Discharger to update its TRE Workplan in accordance with USEPA guidance. In addition, the provision provides a numeric toxicity

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<sup>1</sup> Weston, Donald P., “Urban and Agricultural Sources of Pyrethroid Insecticides to the Sacramento-San Joaquin Delta of California”, Environmental Science & Technology, Vol. 44, No. 5, 2010.

monitoring trigger and requirements for accelerated monitoring, as well as, requirements for TRE initiation if toxicity has been demonstrated.

**Monitoring Trigger.** As discussed in Section IV.C.2.d, above, this Order allows a chronic aquatic toxicity mixing zone. The mixing zone extends 350 feet downstream of the outfall. A numeric toxicity monitoring trigger of **> 6 TUC** (where TUC = 100/NOEC) is applied in the provision. Therefore, a TRE is triggered when the effluent exhibits toxicity at 16.7% effluent. The numeric monitoring trigger represents the in-stream waste concentration at the edge of the chronic mixing zone. The in-stream waste concentration is the concentration of the effluent in the receiving water after mixing (i.e., inverse of the dilution factor). The Discharger has conducted extensive modeling of the discharge and has estimated the average dilution in the area of impact for several locations downstream of the diffuser at various river:effluent flow ratios. Table F-21, below, shows, in part, output from the model at a distance of 300 feet downstream<sup>45</sup>.

**Table F-21. Average Dilution at 300 feet Downstream of Outfall**

Flow Ratio (River:Effluent)	Average Dilution <sup>46</sup>
14:1	6.6
25:1	12.5
50:1	23.2
100:1	39.5

The SIP recommends that dilution for chronic aquatic toxicity be calculated using the 7Q10 receiving water flow and highest 4-day average effluent flow. Based on Sacramento River flow data at Freeport from 1970 to 2009, the 7Q10 river flow is 5,846 cfs. The permitted average dry weather flow (ADWF) is 181 mgd or 279 cfs. The design average day maximum month flow (ADMMF) for the Facility is 399 cfs<sup>47</sup>. It is appropriate to use the ADMMF to determine the critical flow ratio. Using the ADMMF wastewater flow and 7Q10 receiving water flow, the flow ratio is 14.5:1. Based on the average dilutions shown in Table F-21, above, the average dilution at a flow ratio of 14:1 is 6.6. Therefore, the in-stream waste concentration at the edge of the chronic aquatic toxicity mixing zone is 6.6. This value has been rounded down to 6 for establishment of the chronic toxicity monitoring trigger.

<sup>45</sup> Table 3-5 - Average dilution in the area of impact for different modeled topography at an effluent flow rate of 181 mgd, "Water Quality Modeling in Support of Impact Assessments for the Sacramento Regional Wastewater Treatment Plant 2020 Master Plan EIR" (Attachment F of EIR)

<sup>46</sup> The average dilutions have been reduced by a factor of 74/99, due to a reduction in open diffuser ports from 99 to 74. This factor was recommended by Susan Paulson, Flow Science Inc., in a meeting with SRCSD staff and Central Valley Water Board staff on 26 February 2009.

<sup>47</sup> The ADMMF/ADWF peaking factor is 1.43 (Project Memorandum from Carrollo Engineering to SRCSD, dated 19 August 2010).

**Accelerated Monitoring.** The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete.

The provision requires accelerated monitoring consisting of four chronic toxicity tests in a six-week period (i.e., one test every two weeks) using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991 (TSD). The TSD at page 118 states, “EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.” Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity (i.e. toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

See the WET Accelerated Monitoring Flow Chart (Figure F-2), below, for further clarification of the accelerated monitoring requirements and for the decision points for determining the need for TRE initiation.

**TRE Guidance.** The Discharger is required to prepare a TRE Workplan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

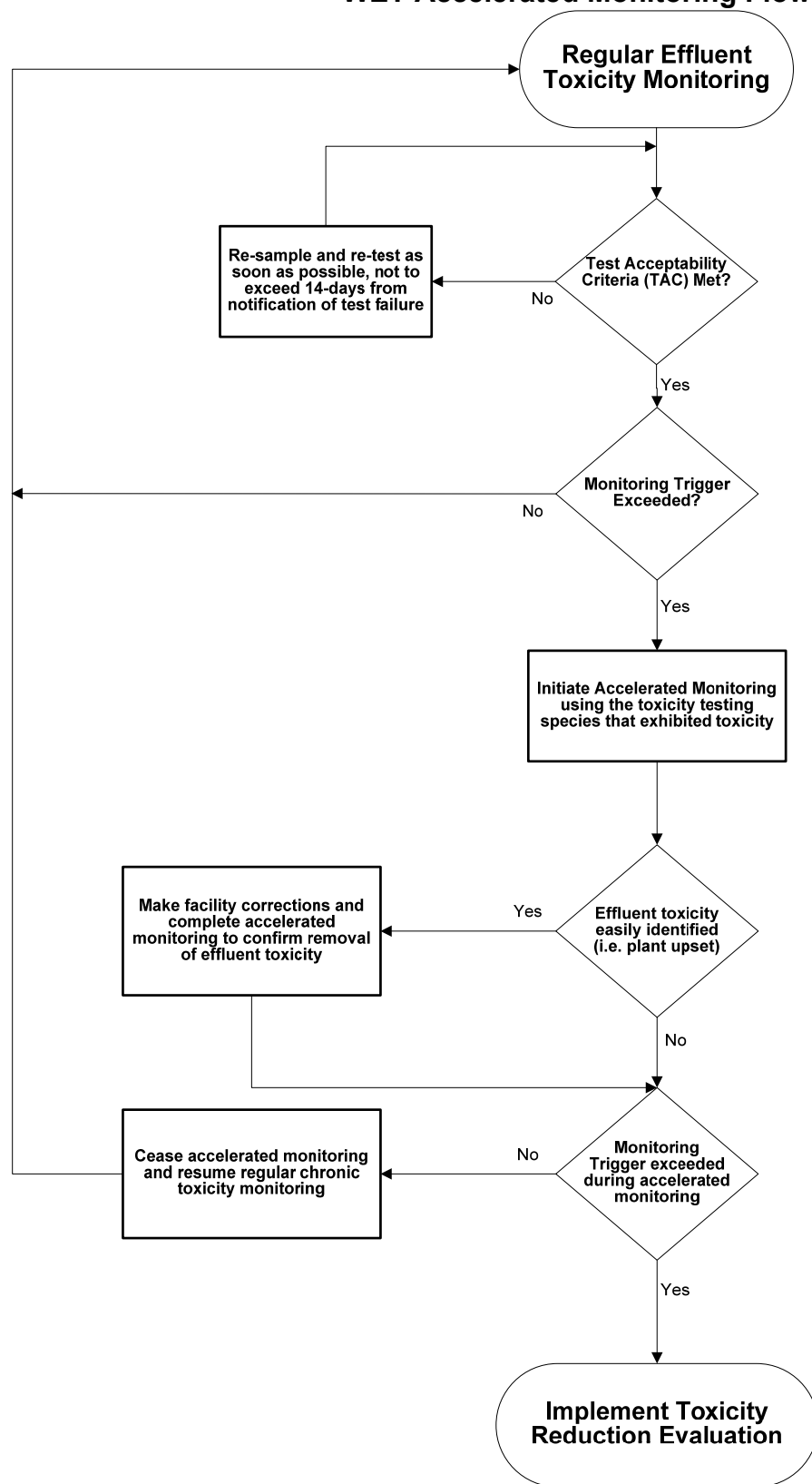
- Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants, EPA/833-B-99/002, August 1999.
- Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs), EPA/600/2-88/070, April 1989.
- Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition, EPA 600/6-91/003, February 1991.
- Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, EPA/600/6-91/005F, May 1992.
- Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA/600/R-92/080, September 1993.

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- Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition, EPA 600/R-92/081, September 1993.
- Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition, EPA-821-R-02-012, October 2002.
- Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA-821-R-02-013, October 2002.
- Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991.

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**Figure F-2**  
**WET Accelerated Monitoring Flow Chart**



- b. Temperature Study.** The Discharger shall submit a workplan and time schedule for Executive Officer approval for determining whether permitted conditions are protective of delta smelt and the Sacramento biota and will increase the level of certainty regarding the determination. The workplan will shall be implemented upon approval by the Executive Officer. The study will include the following:
- i. Continuous monitoring of the thermal discharge in coordination with mixing zone monitoring during December – June.
  - ii. An evaluation using hydroacoustic technology to determine if there are aggregations of large fish or schools of small fish in the zone of elevated water temperature that are atypical compared to other nearby mid-channel river reaches.
  - iii. District initiated ambient water acute toxicity testing using rainbow trout, bi-weekly during December – June for two years. The tests should employ a control using water from upstream of Freeport Bridge and using ambient river water either in situ or at the temperature it was collected, from about 65 feet downstream of the diffuser.
  - iv. District initiated ambient water chronic toxicity testing using rainbow trout, bi-weekly during December - June for two years. The tests should employ a control using water from upstream of Freeport Bridge and using ambient river water either in situ or at the temperature it was collected, from about 360 feet downstream of the diffuser.

### 3. Best Management Practices and Pollution Prevention

- a. Salinity Evaluation and Minimization Plan.** An Evaluation and Minimization Plan for salinity is required in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of salinity to Sacramento River.
- b. 2,3,7,8-TCDD and Other Dioxin and Furan Congeners Source Evaluation and Minimization Plan.** The Discharger will be required to prepare a 2,3,7,8-TCDD and other dioxin and furan congeners evaluation and minimization plan to address sources of detectable dioxins (OCDD and 1,2,3,4,6,7,8-HpCDD) and furans (OCDF) from the Facility. The plan is required in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of dioxin and furan congeners to the receiving water.

### Construction, Operation, and Maintenance Specifications

- a. Emergency Storage Basin Operating Requirements.** The operation and maintenance specifications for the emergency storage basin are necessary to ensure proper operation of the emergency storage basin and minimize the potential for impacts to groundwater quality.

- b. Turbidity.** Operations specifications for turbidity are included as an indicator of the effectiveness of the treatment process and to assure compliance with effluent limitations for total coliform organisms. The tertiary treatment process is capable of reliably meeting a turbidity limitation of 2 nephelometric turbidity units (NTU) as a daily average. Failure of the treatment system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. The operational specification requires that turbidity shall not exceed 2 NTU as a daily average; 5 NTU, more than 5 percent of the time within a 24-hour period; and an instantaneous maximum of 10 NTU.

### **Special Provisions for Municipal Facilities (POTWs Only)**

- a. Pretreatment Requirements.** The federal CWA section 307(b), and federal regulations, 40 CFR Part 403, require publicly owned treatment works to develop an acceptable industrial pretreatment program. A pretreatment program is required to prevent the introduction of pollutants, which will interfere with treatment plant operations or sludge disposal, and prevent pass through of pollutants that exceed water quality objectives, standards or permit limitations. Pretreatment requirements are imposed pursuant to 40 CFR Part 403.

The Discharger shall implement and enforce its approved pretreatment program and is an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or USEPA may take enforcement actions against the Discharger as authorized by the CWA.

- b.** The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (General Order) on 2 May 2006. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSOs), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. Inasmuch that the Discharger's collection system is part of the system that is subject to this Order, certain standard provisions are applicable as specified in Provisions, section VI.C.5. For instance, the 24-hour reporting requirements in this Order are not included in the General Order. The Discharger must comply with both the General Order and this Order. The Discharger and public agencies that are discharging wastewater into the facility were required to obtain enrollment for regulation under the General Order by 1 December 2006.



## Other Special Provisions

- a. Ownership Change.** To maintain the accountability of the operation of the Facility, the Discharger is required to notify the succeeding owner or operator of the existence of this Order by letter if, and when, there is any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger.

## Compliance Schedules

- a.** The Discharger submitted a request, and justification (dated 20 August 2010), for a compliance schedule for BOD<sub>5</sub>, TSS, ammonia, chlorpyrifos and total coliform organisms. The compliance schedule justification included all items specified in Paragraph 3, items (a) through (d), of section 2.1 of the SIP. This Order establishes a compliance schedule for the new, final WQBELs for BOD<sub>5</sub>, TSS, ammonia, chlorpyrifos and total coliform organisms and requires full compliance by 1 December 2020.
- b.** A pollution prevention plan for ammonia and chlorpyrifos is required in this Order per CWC section 13263.3(d)(1)(C). In accordance with CWC section 13263.3(d)(3), the pollution prevention plans for ammonia and chlorpyrifos shall, at a minimum, meet the following requirements:
- (1)** An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of a pollutant in the treatment plant influent.
  - (2)** An analysis of the methods that could be used to prevent the discharge of the pollutants into the Facility, including application of local limits to industrial or commercial dischargers regarding pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the Facility. The analysis also shall identify sources, or potential sources, not within the ability or authority of the Discharger to control, such as pollutants in the potable water supply, airborne pollutants, pharmaceuticals, or pesticides, and estimate the magnitude of those sources, to the extent feasible.
  - (3)** An estimate of load reductions that may be attained through the methods identified in subparagraph ii.
  - (4)** A plan for monitoring the results of the pollution prevention program.
  - (5)** A description of the tasks, cost, and time required to investigate and implement various elements in the pollution prevention plan.
  - (6)** A statement of the Discharger's pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Discharger's intended pollution prevention activities for the immediate future.

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- (7) A description of the Discharger's existing pollution prevention programs.
- (8) An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.
- (9) An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.

## **VIII. PUBLIC PARTICIPATION**

The Central Valley Water Board is considering the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the Central Valley Water Board staff has developed tentative WDRs. The Central Valley Water Board encourages public participation in the WDR adoption process.

### **A. Notification of Interested Parties**

The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through publication of a Notice of Public Hearing in the Sacramento Bee. The Notice was also posted at the Sacramento City Hall and at the entrance to the Facility.

### **B. Written Comments**

The staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail to the Executive Office at the Central Valley Water Board at the address above on the cover page of this Order.

To be fully responded to by staff and considered by the Central Valley Water Board, written comments must be received at the Central Valley Water Board offices by 5:00 p.m. on **8 October 2010**.

### **C. Public Hearing**

The Central Valley Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date: 8,9,10 December 2010  
Time: 8:30 a.m.  
Location: Regional Water Quality Control Board, Central Valley Region  
11020 Sun Center Dr., Suite #200  
Rancho Cordova, CA 95670

Interested persons are invited to attend. At the public hearing, the Central Valley Water Board will hear testimony, if any, pertinent to the discharge, WDRs, and permit. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

Please be aware that dates and venues may change. Our Web address is [www.waterboards.ca.gov/centralvalley](http://www.waterboards.ca.gov/centralvalley) where you can access the current agenda for changes in dates and locations.

#### **D. Waste Discharge Requirements Petitions**

Any aggrieved person may petition the State Water Board to review the decision of the Central Valley Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Central Valley Water Board's action to the following address:

State Water Resources Control Board  
Office of Chief Counsel  
P.O. Box 100, 1001 I Street  
Sacramento, CA 95812-0100

#### **E. Information and Copying**

The Report of Waste Discharge, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Valley Water Board by calling (916) 464-3291.

#### **F. Register of Interested Persons**

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Central Valley Water Board, reference this Facility, and provide a name, address, and phone number.

#### **G. Additional Information**

Requests for additional information or questions regarding this order should be directed to Ms. Kathy Harder at (916) 464-4778.

## ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS

Constituent	Applicable Water Quality Objective/Criteria {Basis} (C)	Maximum Effluent Concentration (MEC)	Receiving Water Concentration (Sacramento River @ Freeport) (B)	Reason for Reasonable Potential
Copper	7.7/3.0 <sup>1</sup> {CTR Aquatic Life}	6.34	20.4	B > C
Mercury <sup>2</sup>	0.05 {CTR Human Health}	0.01	0.0892	B > C
Cyanide	5.2 {CTR Aquatic Life}	10	5	MEC > C
Carbon Tetrachloride	0.25 {CTR Human Health}	0.5	<0.1	MEC > C
Chlorodibromomethane	0.41 {CTR Human Health}	0.7	<0.18	MEC > C
Dichlorobromomethane	0.56 {CTR Human Health}	2.5	<0.14	MEC > C
Methylene Chloride	4.7 {CTR Human Health}	5.4	<0.35	MEC > C
Tetrachloroethylene	0.8 {CTR Human Health}	0.9	0.21	MEC > C
Pentachlorophenol	0.28 {CTR Human Health}	5.7	0.026	MEC > C
Bis(2-Ethylhexyl) Phthalate	1.8 {CTR Human Health}	8.1	0.57	MEC > C
Dibenzo(ah) anthracene	0.0044 {CTR Human Health}	0.51	0.0026	MEC > C
1,2-Diphenyl-hydrazine	0.04 {CTR Human Health}	2.8	<1	MEC > C
N-nitrosodimethylamine	0.00069 {CTR Human Health}	0.044	<0.01	MEC > C
Aluminum	200 {Secondary MCL}	44.4	8800	B > C
Ammonia (mg/L)	1.23 <sup>3</sup> {USEPA NAWQC}	45	1.3	B > C & MEC > C
Manganese	50 {Basin Plan}	65	130	B > C & MEC > C
MTBE	5 {Secondary MCL}	5.8	1.9	MEC > C
Chlorpyrifos	0.025 (Basin Plan)	0.039	0.0058	MEC>C

<sup>1</sup> Effluent copper criteria is 7.7 µg/L based on a minimum effluent hardness of 80 mg/L (as CaCO<sub>3</sub>) and background copper criteria is 3.0 µg/L based on a minimum upstream receiving water hardness of 26 mg/L (as CaCO<sub>3</sub>). Default EPA translators were used.

<sup>2</sup> Receiving Water concentration from Coordinated Monitoring Program (CMP) @ Freeport Summary 1992-2008

<sup>3</sup> Water quality criteria (chronic criterion) calculated using the maximum upstream receiving water pH of 8.8 and corresponding temperature of 15.1C° that occurred on 10/21/1998

### General Notes:

- Effluent data from June 2005-July 2008 from discharger self-monitoring reports (SMRs); Receiving water data from 1992-2008 from SMRs & CMP
- All units in µg/L unless specified
- All metals criteria is expressed as total recoverable
- MCL = Maximum Contaminant Level
- NAWQC = National Ambient Water Quality Criteria
- CTR = California Toxics Rule

ATTACHMENT H – CALCULATION OF WQBELS

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT	Ammonia (acute and chronic dilution)	Ammonia (chronic dilution only)	Ammonia (no dilution)	Copper (acute and chronic dilution)	Copper (chronic dilution only)	Copper (no dilution)	Cyanide (acute and chronic dilution)	Cyanide (chronic dilution only)	Cyanide (no dilution)	Chlorpyrifos (acute and chronic dilution)	Chlorpyrifos (chronic dilution only)	Chlorpyrifos (no dilution)	Aluminum	Carbon Tetrachloride (w/dilution)	Carbon Tetrachloride (no dilution)	DCBM (w/dilution)	DCBM (no dilution)	DCBM (w/dilution)	DCBM (no dilution)	Bis(2-ethylhexyl) phthalate (w/dilution)	Bis(2-ethylhexyl) phthalate (no dilution)	Methylene Chloride (w/dilution)	Methylene Chloride (no dilution)	Tetrachloroethylene (w/dilution)	Tetrachloroethylene (no dilution)	Pentachlorophenol (w/dilution)	Pentachlorophenol (no dilution)	Dibenz(a,h)anthracene (w/dilution)	Dibenz(a,h)anthracene (no dilution)	1,2-Diphenyl-Hydrazine (w/dilution)	1,2-Diphenyl-Hydrazine (no dilution)	NDMA (w/dilution)	NDMA (no dilution)	Manganese (w/dilution)	Manganese (no dilution)	MTBE (w/dilution)	MTBE (no dilution)			
Units	mg/L (as N)			ug/L			ug/L			ug/L			ug/L	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		
Applicable Criteria																																								
Basis and Criteria type	NAWQC			CTR			CTR			Basin Plan			MCL	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	(carcinogen)	MCL	MCL				
Acute Aquatic Life Criterion	variable	13.3	2.14	variable	11	11	22			0.025			750	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Chronic Aquatic Life Criterion	variable	variable	1.68	variable	variable	7.7	5.2			0.015			750	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Human Health Criterion	n/a	n/a	n/a	n/a	n/a	n/a	n/a			n/a			200	0.25	0.41	0.56	0.56	1.8	4.7	0.8	0.28	0.0044	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	0.00069	0.04	
Effluent Concentration Allowance (ECA)																																								
Ambient Background Concentration	1.5			5.1			2.5			0.006			970	0.1	0.2	0.14	0.14	0.16	0.16	0.35	0.35	0.15	0.15	0.07	0.07	0.001	0.001	1	1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
Dilution Credit (acute)	Model	0	0	Model	0	0	Model	0	0	Model	0	0	Model	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Dilution Credit (chronic)	Model	Model	0	Model	Model	0	Model	Model	0	Model	Model	0	Model	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Dilution Credit (human health)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	56	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	56	0	
ECA acute	variable	13.3	2.14	variable	11	11	variable	22	22	0.025	0.025	0.025	750	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ECA chronic	variable	variable	1.68	variable	variable	7.7	variable	variable	5.2	0.015	0.015	0.015	750	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
ECA Human Health	n/a			n/a			n/a			n/a			200	8.7	0.25	12.2	0.41	24.1	0.6	93.6	1.8	248	5	37.2	0.8	12.0	0.3	0.2	0.0	0.04	0.04	0.00069	0.00069	2637	50	256	5	256	5	
Effluent Statistics (6/1/2005 - 7/31/2008)																																								
Number of Samples	334			86			148			0.307			67	73	73	73	73	87	73	73	73	73	73	87	73	87	116	116	85	85	97	97	34	34	101	101	101	101		
Mean	24			4.30			4.60			0.01			18.00	0.12	0.14	0.92	0.92	2.60	0.98	0.98	0.18	0.18	0.51	0.51	0.32	0.32	0.46	0.46	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72		
Standard Deviation	3.7			0.73			2.5			0.009			5.3	0.06	0.09	0.51	0.51	1.4	0.78	0.78	0.12	0.12	0.56	0.56	0.24	0.24	0.33	0.33	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86		
Coefficient of Variation	0.15			0.17			0.54			0.60			0.29	0.60	0.64	0.55	0.55	0.54	0.80	0.80	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
WQBELs Calculations																																								
σ <sup>2</sup>	0.023			0.028			0.259			0.307			0.083	0.307	0.346	0.268	0.268	0.255	0.491	0.491	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307	0.307		
σ <sub>4</sub> <sup>2</sup>	0.006			0.007			0.071			0.086			0.021	0.086	0.098	0.074	0.074	0.070	0.147	0.147	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086	0.086		
σ <sup>30</sup>	0.001			n/a			n/a			n/a			n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
ECA Multiplier acute	0.708			0.685			0.349			0.321			0.533	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
ECA Multiplier chronic	0.937			0.824			0.557			0.527			0.719	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
LTA acute	43.9	9.42	1.52	6.70	7.54	7.54	21.30	7.67	7.67	0.019	0.008	0.008	399.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LTA chronic	36.4	36.4	1.57	66.00	66.00	6.35	13.90	13.90	2.90	0.114	0.114	0.008	539.3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
minimum of LTAs	36.40	9.42	1.52	6.70	7.54	6.35	13.90	7.67	2.90	0.019	0.008	0.008	399.8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
MDEL mult99	1.412			1.459			2.869			3.114			1.876	3.114	3.304	2.916	2.916	2.847	3.991	3.991	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114	3.114		
AMEL mult95	1.132			1.145			1.497			1.552			1.259	1.552	1.595	1.508	1.508	1.492	1.746	1.746	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552	1.552		
MDEL/AMEL Multiplier	n/a			n/a			n/a			n/a			n/a	2.01	2.07	1.93	1.93	1.91	2.29	2.29	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	
WQBELs																																								
Average Monthly Effluent Limitation	41	11	1.7	7.7	8.6	7.3	21	11	4.3	0.029	0.012	0.012	503	9	0.25	12	0.41	24	0.56	94	1.80	248	4.7	37	0.80	12	0.28	0.19	0.004	0.04	0.00069	0.00069	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Maximum Daily Effluent Limitation	51	13	2.1	9.8	11.0	9.3	40	22	8.3	0.059	0.025	0.025	750	17	0.50	25	0.85	47	1.08	179	3.43	568	10.7	75	1.6	24	0.56	0.39	0.009	0.08	0.00138	0.00138	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Annual Average Effluent Limitation	n/a			n/a			n/a			n/a			200	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Facility Performance	45			6.8			11			0.120			35	5.30	2.20	3.4	3.4	13.0	5.4	4.4	18.0	1.6	8.7	5.3	18.0	1.6	8.7	5.3	18.0	1.6	8.7	5.3	18.0	1.6	8.7	5.3	18.0	1.6	8.7	5.3

## ATTACHMENT I – EFFLUENT AND RECEIVING WATER CHARACTERIZATION STUDY

- I. Background.** Sections 2.4.1 through 2.4.4 of the SIP provide minimum standards for analyses and reporting. (Copies of the SIP may be obtained from the State Water Resources Control Board, or downloaded from <http://www.waterboards.ca.gov/iswp/index.html>). To implement the SIP, effluent and receiving water data are needed for all priority pollutants. Effluent and receiving water pH and hardness are required to evaluate the toxicity of certain priority pollutants (such as heavy metals) where the toxicity of the constituents varies with pH and/or hardness. Section 3 of the SIP prescribes mandatory monitoring of dioxin congeners. In addition to specific requirements of the SIP, the Central Valley Water Board is requiring the following monitoring:
- **Drinking water constituents.** Constituents for which drinking water Maximum Contaminant Levels (MCLs) have been prescribed in the California Code of Regulation are included in the *Water Quality Control Plan, Fourth Edition, for the Sacramento and San Joaquin River Basins* (Basin Plan). The Basin Plan defines virtually all surface waters within the Central Valley Region as having existing or potential beneficial uses for municipal and domestic supply. The Basin Plan further requires that, at a minimum, water designated for use as domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the MCLs contained in the California Code of Regulations.
  - **Effluent and receiving water temperature.** This is both a concern for application of certain temperature-sensitive constituents, such as fluoride, and for compliance with the Basin Plan's thermal discharge requirements.
  - **Effluent and receiving water hardness and pH.** These are necessary because several of the CTR constituents are hardness and pH dependent.
  - **Dioxin and furan sampling.** Section 3 of the SIP has specific requirements for the collection of samples for analysis of dioxin and furan congeners, which are detailed in Attachment J. < Pursuant to Section 13267 of the California Water Code, this Order includes a requirement for the Discharger to submit monitoring data for the effluent and receiving water as described in Attachment J.
- II. Monitoring Requirements.**
- A. Three times per Year Monitoring.** **Three times per year** priority pollutant samples shall be collected from the effluent and upstream receiving water (EFF-001 and RSW-001) and analyzed for the constituents listed in Table I-1. **Three times per year** monitoring shall be conducted every year and the results of such monitoring be submitted to the Central Valley Water Board, during the fourth year of the permit term. Each individual monitoring event shall provide representative sample results for the effluent and upstream receiving water.

- B. Semi-annual Monitoring (dioxins and furans only).** Semi-annual monitoring is required for dioxins and furans, as specified in Attachment J. The results of dioxin and furan monitoring shall be submitted to the Central Valley Water Board with the quarterly priority data at the completion of the Effluent and Receiving Water Characterization Study, and during the fourth year of the permit term.
- C. Concurrent Sampling.** Effluent and receiving water sampling shall be performed at approximately the same time, on the same date.
- D. Sample type.** All effluent samples shall be taken as 24-hour flow proportioned composite samples. All receiving water samples shall be taken as grab samples.

**Table I-1. Priority Pollutants**

CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
VOLATILE ORGANICS						
28	1,1-Dichloroethane	75343	Primary MCL	5	0.5	EPA 8260B
30	1,1-Dichloroethene	75354	National Toxics Rule	0.057	0.5	EPA 8260B
41	1,1,1-Trichloroethane	71556	Primary MCL	200	0.5	EPA 8260B
42	1,1,2-Trichloroethane	79005	National Toxics Rule	0.6	0.5	EPA 8260B
37	1,1,2,2-Tetrachloroethane	79345	National Toxics Rule	0.17	0.5	EPA 8260B
75	1,2-Dichlorobenzene	95501	Taste & Odor	10	0.5	EPA 8260B
29	1,2-Dichloroethane	107062	National Toxics Rule	0.38	0.5	EPA 8260B
	cis-1,2-Dichloroethene	156592	Primary MCL	6	0.5	EPA 8260B
31	1,2-Dichloropropane	78875	Calif. Toxics Rule	0.52	0.5	EPA 8260B
101	1,2,4-Trichlorobenzene	120821	Public Health Goal	5	0.5	EPA 8260B
76	1,3-Dichlorobenzene	541731	Taste & Odor	10	0.5	EPA 8260B
32	1,3-Dichloropropene	542756	Primary MCL	0.5	0.5	EPA 8260B
77	1,4-Dichlorobenzene	106467	Primary MCL	5	0.5	EPA 8260B
17	Acrolein	107028	Aquatic Toxicity	21	2	EPA 8260B
18	Acrylonitrile	107131	National Toxics Rule	0.059	2	EPA 8260B
19	Benzene	71432	Primary MCL	1	0.5	EPA 8260B
20	Bromoform	75252	Calif. Toxics Rule	4.3	0.5	EPA 8260B
34	Bromomethane	74839	Calif. Toxics Rule	48	1	EPA 8260B
21	Carbon tetrachloride	56235	National Toxics Rule	0.25	0.5	EPA 8260B
22	Chlorobenzene (mono chlorobenzene)	108907	Taste & Odor	50	0.5	EPA 8260B
24	Chloroethane	75003	Taste & Odor	16	0.5	EPA 8260B
25	2- Chloroethyl vinyl ether	110758	Aquatic Toxicity	122 (3)	1	EPA 8260B
26	Chloroform	67663	OEHHA Cancer Risk	1.1	0.5	EPA 8260B
35	Chloromethane	74873	USEPA Health Advisory	3	0.5	EPA 8260B
23	Dibromochloromethane	124481	Calif. Toxics Rule	0.41	0.5	EPA 8260B

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CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
27	Dichlorobromomethane	75274	Calif. Toxics Rule	0.56	0.5	EPA 8260B
36	Dichloromethane	75092	Calif. Toxics Rule	4.7	0.5	EPA 8260B
33	Ethylbenzene	100414	Taste & Odor	29	0.5	EPA 8260B
88	Hexachlorobenzene	118741	Calif. Toxics Rule	0.00075	1	EPA 8260B
89	Hexachlorobutadiene	87683	National Toxics Rule	0.44	1	EPA 8260B
91	Hexachloroethane	67721	National Toxics Rule	1.9	1	EPA 8260B
94	Naphthalene	91203	USEPA IRIS	14	10	EPA 8260B
38	Tetrachloroethene	127184	National Toxics Rule	0.8	0.5	EPA 8260B
39	Toluene	108883	Taste & Odor	42	0.5	EPA 8260B
40	trans-1,2-Dichloroethylene	156605	Primary MCL	10	0.5	EPA 8260B
43	Trichloroethene	79016	National Toxics Rule	2.7	0.5	EPA 8260B
44	Vinyl chloride	75014	Primary MCL	0.5	0.5	EPA 8260B
	Methyl-tert-butyl ether (MTBE)	1634044	Secondary MCL	5	0.5	EPA 8260B
	Trichlorofluoromethane	75694	Primary MCL	150	5	EPA 8260B
	1,1,2-Trichloro-1,2,2-Trifluoroethane	76131	Primary MCL	1200	10	EPA 8260B
	Styrene	100425	Taste & Odor	11	0.5	EPA 8260B
	Xylenes	1330207	Taste & Odor	17	0.5	EPA 8260B
<b>SEMI-VOLATILE ORGANICS</b>						
60	1,2-Benzanthracene	56553	Calif. Toxics Rule	0.0044	5	EPA 8270C
85	1,2-Diphenylhydrazine	122667	National Toxics Rule	0.04	1	EPA 8270C
45	2-Chlorophenol	95578	Taste and Odor	0.1	2	EPA 8270C
46	2,4-Dichlorophenol	120832	Taste and Odor	0.3	1	EPA 8270C
47	2,4-Dimethylphenol	105679	Calif. Toxics Rule	540	2	EPA 8270C
49	2,4-Dinitrophenol	51285	National Toxics Rule	70	5	EPA 8270C
82	2,4-Dinitrotoluene	121142	National Toxics Rule	0.11	5	EPA 8270C
55	2,4,6-Trichlorophenol	88062	Taste and Odor	2	10	EPA 8270C
83	2,6-Dinitrotoluene	606202	USEPA IRIS	0.05	5	EPA 8270C
50	2-Nitrophenol	25154557	Aquatic Toxicity	150 (5)	10	EPA 8270C
71	2-Chloronaphthalene	91587	Aquatic Toxicity	1600 (6)	10	EPA 8270C
78	3,3'-Dichlorobenzidine	91941	National Toxics Rule	0.04	5	EPA 8270C
62	3,4-Benzofluoranthene	205992	Calif. Toxics Rule	0.0044	10	EPA 8270C
52	4-Chloro-3-methylphenol	59507	Aquatic Toxicity	30	5	EPA 8270C
48	4,6-Dinitro-2-methylphenol	534521	National Toxics Rule	13.4	10	EPA 8270C
51	4-Nitrophenol	100027	USEPA Health Advisory	60	5	EPA 8270C
69	4-Bromophenyl phenyl ether	101553	Aquatic Toxicity	122	10	EPA 8270C
72	4-Chlorophenyl phenyl ether	7005723	Aquatic Toxicity	122 (3)	5	EPA 8270C
56	Acenaphthene	83329	Taste and Odor	20	1	EPA 8270C



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CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
57	Acenaphthylene	208968	No Criteria Available		10	EPA 8270C
58	Anthracene	120127	Calif. Toxics Rule	9,600	10	EPA 8270C
59	Benzidine	92875	National Toxics Rule	0.00012	5	EPA 8270C
61	Benzo(a)pyrene (3,4-Benzopyrene)	50328	Calif. Toxics Rule	0.0044	0.1	EPA 8270C
63	Benzo(g,h,i)perylene	191242	No Criteria Available		5	EPA 8270C
64	Benzo(k)fluoranthene	207089	Calif. Toxics Rule	0.0044	2	EPA 8270C
65	Bis(2-chloroethoxy) methane	111911	No Criteria Available		5	EPA 8270C
66	Bis(2-chloroethyl) ether	111444	National Toxics Rule	0.031	1	EPA 8270C
67	Bis(2-chloroisopropyl) ether	39638329	Aquatic Toxicity	122 (3)	10	EPA 8270C
68	Bis(2-ethylhexyl) phthalate	117817	National Toxics Rule	1.8	3	EPA 8270C
70	Butyl benzyl phthalate	85687	Aquatic Toxicity	3 (7)	10	EPA 8270C
73	Chrysene	218019	Calif. Toxics Rule	0.0044	5	EPA 8270C
81	Di-n-butylphthalate	84742	Aquatic Toxicity	3 (7)	10	EPA 8270C
84	Di-n-octylphthalate	117840	Aquatic Toxicity	3 (7)	10	EPA 8270C
74	Dibenzo(a,h)-anthracene	53703	Calif. Toxics Rule	0.0044	0.1	EPA 8270C
79	Diethyl phthalate	84662	Aquatic Toxicity	3 (7)	2	EPA 8270C
80	Dimethyl phthalate	131113	Aquatic Toxicity	3 (7)	2	EPA 8270C
86	Fluoranthene	206440	Calif. Toxics Rule	300	10	EPA 8270C
87	Fluorene	86737	Calif. Toxics Rule	1300	10	EPA 8270C
90	Hexachlorocyclopentadiene	77474	Taste and Odor	1	1	EPA 8270C
92	Indeno(1,2,3-c,d)pyrene	193395	Calif. Toxics Rule	0.0044	0.05	EPA 8270C
93	Isophorone	78591	National Toxics Rule	8.4	1	EPA 8270C
98	N-Nitrosodiphenylamine	86306	National Toxics Rule	5	1	EPA 8270C
96	N-Nitrosodimethylamine	62759	National Toxics Rule	0.00069	0.002	EPA 521
97	N-Nitrosodi-n-propylamine	621647	Calif. Toxics Rule	0.005	5	EPA 8270C
95	Nitrobenzene	98953	National Toxics Rule	17	10	EPA 8270C
53	Pentachlorophenol	87865	Calif. Toxics Rule	0.28	0.2	EPA 8270C
99	Phenanthrene	85018	No Criteria Available		5	EPA 8270C
54	Phenol	108952	Taste and Odor	5	1	EPA 8270C
100	Pyrene	129000	Calif. Toxics Rule	960	10	EPA 8270C
<b>INORGANICS</b>						
	Aluminum	7429905	Ambient Water Quality	87	50	EPA 6020/200.8
1	Antimony	7440360	Primary MCL	6	5	EPA 6020/200.8
2	Arsenic	7440382	Ambient Water Quality	0.018	0.01	EPA 1632
15	Asbestos	1332214	National Toxics Rule/ Primary MCL	7 MFL	0.2 MFL >10um	EPA/600/R-93/116(PCM)
	Barium	7440393	Basin Plan Objective	100	100	EPA 6020/200.8

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CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
3	Beryllium	7440417	Primary MCL	4	1	EPA 6020/200.8
4	Cadmium	7440439	Public Health Goal	0.07	0.25	EPA 1638/200.8
5a	Chromium (total)	7440473	Primary MCL	50	2	EPA 6020/200.8
5b	Chromium (VI)	18540299	Public Health Goal	0.2	0.5	EPA 7199/1636
6	Copper	7440508	National Toxics Rule	4.1 (2)	0.5	EPA 6020/200.8
14	Cyanide	57125	National Toxics Rule	5.2	5	EPA 9012A
	Fluoride	7782414	Public Health Goal	1000	0.1	EPA 300
	Iron	7439896	Secondary MCL	300	100	EPA 6020/200.8
7	Lead	7439921	Calif. Toxics Rule	0.92 (2)	0.5	EPA 1638
8	Mercury	7439976	TMDL Development		0.0002 (11)	EPA 1669/1631
	Manganese	7439965	Secondary MCL/ Basin Plan Objective	50	20	EPA 6020/200.8
9	Nickel	7440020	Calif. Toxics Rule	24 (2)	5	EPA 6020/200.8
10	Selenium	7782492	Calif. Toxics Rule	5 (8)	5	EPA 6020/200.8
11	Silver	7440224	Calif. Toxics Rule	0.71 (2)	1	EPA 6020/200.8
12	Thallium	7440280	National Toxics Rule	1.7	1	EPA 6020/200.8
	Tributyltin	688733	Ambient Water Quality	0.063	0.002	EV-024/025
13	Zinc	7440666	Calif. Toxics Rule/ Basin Plan Objective	54/ 16 (2)	10	EPA 6020/200.8
<b>PESTICIDES - PCBs</b>						
110	4,4'-DDD	72548	Calif. Toxics Rule	0.00083	0.02	EPA 8081A
109	4,4'-DDE	72559	Calif. Toxics Rule	0.00059	0.01	EPA 8081A
108	4,4'-DDT	50293	Calif. Toxics Rule	0.00059	0.01	EPA 8081A
112	alpha-Endosulfan	959988	National Toxics Rule	0.056 (9)	0.02	EPA 8081A
103	alpha-Hexachlorocyclohexane (BHC)	319846	Calif. Toxics Rule	0.0039	0.01	EPA 8081A
	Alachlor	15972608	Primary MCL	2	1	EPA 8081A
102	Aldrin	309002	Calif. Toxics Rule	0.00013	0.005	EPA 8081A
113	beta-Endosulfan	33213659	Calif. Toxics Rule	0.056 (9)	0.01	EPA 8081A
104	beta-Hexachlorocyclohexane	319857	Calif. Toxics Rule	0.014	0.005	EPA 8081A
107	Chlordane	57749	Calif. Toxics Rule	0.00057	0.1	EPA 8081A
106	delta-Hexachlorocyclohexane	319868	No Criteria Available		0.005	EPA 8081A
111	Dieldrin	60571	Calif. Toxics Rule	0.00014	0.01	EPA 8081A
114	Endosulfan sulfate	1031078	Ambient Water Quality	0.056	0.05	EPA 8081A
115	Endrin	72208	Calif. Toxics Rule	0.036	0.01	EPA 8081A
116	Endrin Aldehyde	7421934	Calif. Toxics Rule	0.76	0.01	EPA 8081A
117	Heptachlor	76448	Calif. Toxics Rule	0.00021	0.01	EPA 8081A
118	Heptachlor Epoxide	1024573	Calif. Toxics Rule	0.0001	0.01	EPA 8081A
105	Lindane (gamma-Hexachlorocyclohexane)	58899	Calif. Toxics Rule	0.019	0.019	EPA 8081A

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CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
119	PCB-1016	12674112	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
120	PCB-1221	11104282	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
121	PCB-1232	11141165	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
122	PCB-1242	53469219	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
123	PCB-1248	12672296	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
124	PCB-1254	11097691	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
125	PCB-1260	11096825	Calif. Toxics Rule	0.00017 (10)	0.5	EPA 8082
126	Toxaphene	8001352	Calif. Toxics Rule	0.0002	0.5	EPA 8081A
	Atrazine	1912249	Public Health Goal	0.15	1	EPA 8141A
	Bentazon	25057890	Primary MCL	18	2	EPA 643/515.2
	Carbofuran	1563662	CDFG Hazard Assess.	0.5	5	EPA 8318
	2,4-D	94757	Primary MCL	70	10	EPA 8151A
	Dalapon	75990	Ambient Water Quality	110	10	EPA 8151A
	1,2-Dibromo-3-chloropropane (DBCP)	96128	Public Health Goal	0.0017	0.01	EPA 8260B
	Di(2-ethylhexyl)adipate	103231	USEPA IRIS	30	5	EPA 8270C
	Dinoseb	88857	Primary MCL	7	2	EPA 8151A
	Diquat	85007	Ambient Water Quality	0.5	4	EPA 8340/549.1/HPLC
	Endothal	145733	Primary MCL	100	45	EPA 548.1
	Ethylene Dibromide	106934	OEHHA Cancer Risk	0.0097	0.02	EPA 8260B/504
	Glyphosate	1071836	Primary MCL	700	25	HPLC/EPA 547
	Methoxychlor	72435	Public Health Goal	30	10	EPA 8081A
	Molinate (Ordram)	2212671	CDFG Hazard Assess.	13	2	EPA 634
	Oxamyl	23135220	Public Health Goal	50	20	EPA 8318/632
	Picloram	1918021	Primary MCL	500	1	EPA 8151A
	Simazine (Princep)	122349	USEPA IRIS	3.4	1	EPA 8141A
	Thiobencarb	28249776	Basin Plan Objective/ Secondary MCL	1	1	HPLC/EPA 639
16	2,3,7,8-TCDD (Dioxin)	1746016	Calif. Toxics Rule	1.30E-08	5.00E-06	EPA 8290 (HRGC) MS
	2,4,5-TP (Silvex)	93765	Ambient Water Quality	10	1	EPA 8151A
	Diazinon	333415	CDFG Hazard Assess.	0.05	0.25	EPA 8141A/GCMS
	Chlorpyrifos	2921882	CDFG Hazard Assess.	0.014	1	EPA 8141A/GCMS
<b>OTHER CONSTITUENTS</b>						
	Ammonia (as N)	7664417	Ambient Water Quality	1500 (4)		EPA 350.1
	Chloride	16887006	Agricultural Use	106,000		EPA 300.0
	Flow			1 CFS		
	Hardness (as CaCO <sub>3</sub> )			5000		EPA 130.2

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CTR #	Constituent	CAS Number	Controlling Water Quality Criterion for Surface Waters		Criterion Quantitation Limit ug/L or noted	Suggested Test Methods
			Basis	Criterion Concentration ug/L or noted <sup>1</sup>		
	Foaming Agents (MBAS)		Secondary MCL	500		SM5540C
	Nitrate (as N)	14797558	Primary MCL	10,000	2,000	EPA 300.0
	Nitrite (as N)	14797650	Primary MCL	1000	400	EPA 300.0
	pH		Basin Plan Objective	6.5-8.5	0.1	EPA 150.1
	Phosphorus, Total (as P)	7723140	USEPA IRIS	0.14		EPA 365.3
	Specific conductance (EC)		Agricultural Use	700 umhos/cm		EPA 120.1
	Sulfate		Secondary MCL	250,000	500	EPA 300.0
	Sulfide (as S)		Taste and Odor	0.029		EPA 376.2
	Sulfite (as SO <sub>3</sub> )		No Criteria Available			SM4500-SO3
	Temperature		Basin Plan Objective	°F		
	Total Dissolved Solids (TDS)		Agricultural Use	450,000		EPA 160.1

FOOTNOTES:

(1) - The Criterion Concentrations serve only as a point of reference for the selection of the appropriate analytical method. They do not indicate a regulatory decision that the cited concentration is either necessary or sufficient for full protection of beneficial uses. Available technology may require that effluent limits be set lower than these values.

(2) - Freshwater aquatic life criteria for metals are expressed as a function of total hardness (mg/L) in the water body. Values displayed correspond to a total hardness of 40 mg/L.

(3) - For haloethers

(4) - Freshwater aquatic life criteria for ammonia are expressed as a function of pH and temperature of the water body. Values displayed correspond to pH 8.0 and temperature of 22°C.

(5) - For nitrophenols.

(6) - For chlorinated naphthalenes.

(7) - For phthalate esters.

(8) - Basin Plan objective = 2 ug/L for Salt Slough and specific constructed channels in the Grassland watershed.

(9) - Criteria for sum of alpha- and beta- forms.

(10) - Criteria for sum of all PCBs.

(11) - Mercury monitoring shall utilize "ultra-clean" sampling and analytical methods. These methods include:

Method 1669: Sampling Ambient Water for Trace Metals at USEPA Water Quality Criteria Levels, USEPA; and

Method 1631: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence, USEPA

### III. Additional Study Requirements

**A. Laboratory Requirements.** The laboratory analyzing the monitoring samples shall be certified by the Department of Health Services in accordance with the provisions of Water Code 13176 and must include quality assurance/quality control data with their reports (ELAP certified).

**B. Criterion Quantitation Limit (CQL).** The criterion quantitation limits will be equal to or lower than the minimum levels (MLs) in Appendix 4 of the SIP or the detection limits for purposes of reporting (DLRs) below the controlling water quality criterion concentrations summarized in Table I-1 of this Order. In cases where the controlling water quality

criteria concentrations are below the detection limits of all approved analytical methods, the best available procedure will be utilized that meets the lowest of the MLs and DLR. Table I-1 contains suggested analytical procedures. The Discharger is not required to use these specific procedures as long as the procedure selected achieves the desired minimum detection level.

- C. Method Detection Limit (MDL).** The method detection limit for the laboratory shall be determined by the procedure found in 40 CFR Part 136, Appendix B (revised as of May 14, 1999).
- D. Reporting Limit (RL).** The reporting limit for the laboratory. This is the lowest quantifiable concentration that the laboratory can determine. Ideally, the RL should be equal to or lower than the CQL to meet the purposes of this monitoring.
- E. Reporting Protocols.** The results of analytical determinations for the presence of chemical constituents in a sample shall use the following reporting protocols:
1. Sample results greater than or equal to the reported RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
  2. Sample results less than the reported RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.
  3. For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may shortened to "Est. Conc."). The laboratory, if such information is available, may include numerical estimates of the data quantity for the reported result. Numerical estimates of data quality may be percent accuracy (+ or – a percentage of the reported value), numerical ranges (low and high), or any other means considered appropriate by the laboratory.
  4. Sample results that are less than the laboratory's MDL shall be reported as "Not Detected" or ND.

**F. Data Format.** The monitoring report shall contain the following information for each pollutant:

1. The name of the constituent.
2. Sampling location.
3. The date the sample was collected.
4. The time the sample was collected.
5. The date the sample was analyzed. For organic analyses, the extraction data will also be indicated to assure that hold times are not exceeded for prepared samples.
6. The analytical method utilized.
7. The measured or estimated concentration.
8. The required Criterion Quantitation Limit (CQL).
9. The laboratory's current Method Detection Limit (MDL), as determined by the procedure found in 40 CFR Part 136, Appendix B (revised as of May 14, 1999).
10. The laboratory's lowest reporting limit (RL).
11. Any additional comments.

## ATTACHMENT J – DIOXIN AND FURAN SAMPLING

The CTR includes criteria for 2,3,7,8-tetrachlorodibenzo-pdioxin (2,3,7,8-TCDD). In addition to this compound, there are many congeners of chlorinated dibenzodioxins (2,3,7,8-CDDs) and chlorinated dibenzofurans (2,3,7,8-CDFs) that exhibit toxic effects similar to those of 2,3,7,8-TCDD. The USEPA has published toxic equivalency factors (TEFs) for 17 of the congeners. The TEFs express the relative toxicities of the congeners compared to 2,3,7,8-TCDD (whose TEF equals 1.0). In June 1997, participants in a World Health Organization (WHO) expert meeting revised TEF values for 1,2,3,7,8-PentaCDD, OctaCDD, and OctaCDF. The current TEFs for the 17 congeners, which include the three revised values, are shown below:

**Toxic Equivalency Factors (TEFs) for 2,3,7,8-TCDD Equivalents**

<b>Congener</b>	<b>TEF</b>
2,3,7,8-TetraCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1
1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

The Discharger shall conduct effluent and receiving water monitoring for the 2,3,7,8-TCDD congeners listed above to assess the presence and amounts of the congeners being discharged and already present in the receiving water. Effluent and upstream receiving water shall be monitored for the presence of the 17 congeners once during dry weather and once during wet weather for 1 year within the term of the study.

The Discharger shall report, for each congener, the analytical results of the effluent and receiving water monitoring, including the quantifiable limit and the method detection limit, and the measured or estimated concentration.

In addition, the Discharger shall multiply each measured or estimated congener concentration by its respective TEF value and report the sum of these values.

## ATTACHMENT K – AMMONIA-RELATED ISSUES

### Ammonia-Related Issues

The Discharger's undiluted effluent contains ammonia and other chemicals in toxic concentrations. The SRWTP discharges approximately 14 tons of ammonia daily to the Sacramento River at Freeport. The ammonia toxicity is demonstrated by the numerous acute toxicity violations<sup>48</sup>, and ammonia studies by Dr. Werner<sup>49</sup> and by Dr. Teh<sup>50</sup>. Recent Pelagic Organism Decline (POD) has been documented in Sommer, T., C. Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary. Fisheries 32(6):270-277.

. POD related hypotheses include that ammonia from the SRWTP maybe; (1) inhibiting diatom primary production in the Sacramento River downstream of the discharge point, in Suisun Bay and in the Delta, (2) causing acute and/or chronic toxicity to delta smelt and *Pseudodiaptomus forbesi*, an important food organism for larval and juvenile fish, and (3) causing a shift in the algal community from nutritious species of diatoms to less desirable forms like *Microcystis* (blue green algae).

Ammonia Toxicity Criteria – Ammonia is toxic to aquatic life with the toxicity varying with the species and with the pH and temperature of the water. Numeric water quality criteria to address both acute and chronic toxicity have been developed by USEPA in its "1999 Update of Ambient Water Quality Criteria for Ammonia" (September 1999). In the USEPA ammonia criteria, acute ammonia toxicity is represented by the effect on salmonids with acute ammonia toxicity increasing with increasing pH. Acute toxicity is represented by the death of the salmonid indicator species. Chronic ammonia toxicity is represented by the effects on fish early life stages, with chronic ammonia toxicity increasing with increasing pH and temperature. Chronic toxicity is represented by the end points: growth, reproduction and survival of the indicator fish early life stages. The discharge, when the approved mixing zones are considered, is in compliance with current USEPA acute and chronic ammonia criteria.

<sup>48</sup> 1 July 2009 and 12 January 2010 Notices of Violations to Ms. Mary Snyder from Mr. Victor R. Vasquez, Senior Engineer for the NPDES Compliance and Enforcement Unit, Central Valley Regional Water Quality Control Board

<sup>49</sup> Werner, I, "Effects of Ammonia/um and Other Wastewater Effluent Associated Contaminants on Delta Smelt", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>50</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.



Acute Ammonia Toxicity -Recent studies show Delta smelt are as acutely sensitive to ammonia as salmonids<sup>1</sup> are. Thus the USEPA acute ammonia criteria are protective of the Delta smelt. However, recent studies on ammonia and the POD of the Delta indicate USEPA's criteria may not be adequately protective of some other sensitive resident Delta species.<sup>2,3</sup> Dr. Swee Teh from the U.C. Davis School of Veterinary Medicine reported at the Ammonia Summit on the results of acute toxicity testing with two copepods, *Eurytemora affinis* and *Pseudodiaptomus forbesi*. Both invertebrate species are important forage organisms for larval fish, including Delta Smelt, in the Delta. Ten percent mortality occurred to both invertebrate species at ambient ammonia concentrations present in the river below the SRWTP.

Chronic Ammonia Toxicity – Research shows varied results for chronic toxicity from the Discharger's ammonia. There is currently no method for assessing chronic toxicity to delta smelt. Where no method exists, acute to chronic ratios (ACRs) for other freshwater fish species are often used to predict potential chronic toxicological endpoints. ACRs are calculated by dividing the 96-hour LC<sub>50</sub> by the lowest chronic NOEC value. The USEPA (1999) has reported ACR ammonia ratios for six species that ranged between 2 and 21<sup>4</sup>. The lowest reported 96-hour LC<sub>50</sub> for smelt was >0.116 mg/l un-ionized ammonia (Werner *et al.*, 2009). For smelt, dividing 0.116 by 21 results in an estimated chronic NOEC for smelt of 0.0055 mg/l un-ionized ammonia.

During a Central Valley Water Board study, "Draft Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta"<sup>5</sup>, none of the upper 95 percent confidence limits of un-ionized ammonia in the Delta exceeded 0.0055 mg/l suggesting that chronic smelt toxicity is unlikely to have occurred. This conclusion is different from that of Werner *et al.* (2008, 2009). Werner *et al.* concluded that chronic smelt toxicity was possible because of the higher pH values measured in summer in their study. According to Werner, repeated excursions above a pH value of 8.0 would indicate the potential for chronic smelt toxicity.

Dr. Swee Teh also used an ACR analysis and concluded that ambient ammonia concentrations downstream of the SRWTP discharge point might be causing chronic toxicity to both *Eurytemora affinis* and *Pseudodiaptomus forbesi* species. Dr. Teh recommended follow up chronic toxicity studies with invertebrate species. Thirty-day full-life cycle tests were

<sup>1</sup> Werner, I, L Deanovic, M. Stillway, D. Markiewicz 2008. The effects of wastewater treatment effluent associated contaminants on delta smelt. Final Report to the State Water Resources Control Board, p 60 and Werner, I, L Deanovic, M. Stillway, D. Markiewicz 2009. Acute toxicity of ammonia/um and wastewater treatment effluent-associated contaminants on delta smelt—2009. Final Report to the State Water Resources Control Board, p 63

<sup>2</sup> Johnson, M. L. "Species Sensitivity Distributions and Exposure Concentrations; Placing Recent Results in Context", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>3</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>4</sup> The ACR of 21 was from a full life cycle test with fathead minnows (Thurston *et al.*, 1986). The chronic NOEC endpoint was the highest ammonia concentrations not causing any detrimental histopathological effect.

<sup>5</sup> Foe, Chris, "Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta", May 2010.

conducted with *P. forbesi* to evaluate the possibility of chronic instream ammonia toxicity. Preliminary testing has now been completed and Dr. Teh reported at 6 July 2010 IEP Contaminant Work Team meeting that *P. forbesi* reproduction and survival was negatively effected by ammonia concentrations as low as 0.36 mg N/L. Ammonia concentrations of this magnitude were measured by the Central Valley Water Board staff in 2009 and 2010 between the SRWTP and for about 30 miles downstream of the SRWTP<sup>3</sup>. Dr. Teh plans additional experiments to confirm the *P. forbesi* findings and to attempt to establish NOECs and LOECs.

**Proposed 2009 USEPA Ammonia Criteria** – USEPA is in the process of updating its ammonia criteria. USEPA released the “Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater” in December 2009. These criteria would update the 1999 Ammonia criteria currently used by the Central Valley Water Board to develop ammonia effluent limitations to implement the Basin Plan’s narrative toxicity objective. The major change to the criteria is the addition of more stringent ammonia chronic criteria specific to freshwater mussels. The criteria are revised to protect freshwater Unionid mussels. Unionid mussels are more sensitive than larval fish to ammonia. The proposed chronic ammonia criteria with freshwater mussels present is about five to ten times lower than the 1999 chronic criteria for juvenile fish. Table K-1 below compares the most stringent 1999 criteria (fish early life stages present) to the proposed 2009 chronic ammonia criteria for freshwater mussels.

Table K-1 Temperature and pH-Dependent Values - Ammonia Chronic Criterion: USEPA Ammonia Criteria 1999 Fish Early Life Stages Present to Proposed 2009

Species	pH @ 7.5	Temperature, °C					
		14	16	18	20	22	24
<b>Fish early life stages present</b>	<b>1999</b>	<b>4.36</b>	<b>3.97</b>	<b>3.49</b>	<b>3.06</b>	<b>2.69</b>	<b>2.37</b>
<b>Freshwater mussels</b>	<b>2009</b>	<b>0.933</b>	<b>0.82</b>	<b>0.721</b>	<b>0.634</b>	<b>0.577</b>	<b>0.49</b>

The freshwater Unionid mussel *Anadonata* sp. is present in the Sacramento watershed above the City of Sacramento and in the Delta (personal communication, Jeanette Howard)<sup>1</sup>. It is not known whether the mussel is in the lower Sacramento River near the SRWTP. However, *Anadonata* disperses during a larval stage in which it attaches to passing fish. *Anadonata* is present above the SRWTP, therefore, it is likely that *Anadonata* is present in the lower River. If so, then the new draft ammonia criteria for protection of mussels would apply.

A site-specific chronic mussel criterion was calculated for each field sample collected by Central Valley Water Board staff. The USEPA (2009) formula was used to calculate each criterion and then was compared to ambient ammonia levels in the Delta collected during the year long CVRWQB nutrient study. Ambient concentrations never exceeded the criteria. A safety factor was calculated by dividing ambient ammonia concentrations by the estimated site specific chronic mussel criteria. The margin of safety for the Sacramento River above the SRWTP (Tower Bridge and at Garcia Bend) was the highest observed in the system. The

<sup>1</sup> Personal Communications with Dr. Jeanette Howard, March 10, 2010 with Chris Foe, CVWQCB and 17 & 18 March with Kathy Harder, CVWQCB.

safety factor decreased to the lowest level at Hood. Many of the calculated monthly safety factor values for Hood were between one and two indicating a very small margin of safety. Values increased downstream of Hood. About 20 miles downstream of Hood, the average safety factor for Rio Vista was about six<sup>1</sup>.

The Central Valley Water Board results from the nutrient study are consistent with the conclusions of Dr. Diana Engle of Larry Walker Associates who compared ambient ammonia concentrations collected in the Sacramento River and Delta by the Interagency Ecological Program between 1974 and 2000<sup>2</sup>. Dr. Engle's evaluation had only one exceedance of the chronic 1999 criteria was reported in nearly 12,000 measurements. However the Central Valley Water Board evaluation did not include the ammonia, temperature and pH data for R-3, at Cliff's Marina about 4200 feet downstream of the SRWTP discharge point and outside of the Discharger's requested mixing zone. Analysis of the R-3 data concluded USEPA 1999 acute criteria was never exceeded. The State Water Contractors compared ambient ammonia levels immediately outside the SRWTP mixing zone with the draft 2009 USEPA ammonia criteria. The 2009 criteria were exceeded 21 percent of the time between 2007 and 2008 and 41 percent of the time in 2009<sup>3</sup>.

Additive and Synergistic Toxicity – In 2008, Dr. Teh conducted tests on Sacramento River water at Hood, about 8 miles downstream of the SRWTP discharge point. His results showed 95% mortality to *Eurytemora affinis*, a Delta copepod and food for Delta smelt. Further studies<sup>4</sup> completed by Dr. Teh, indicate the Delta copepods, *Pseudodiaptomus forbesi* and *E. affinis* are very sensitive to combined concentrations of ammonia and copper.

Additionally, a study conducted by Dr. Inge Werner<sup>5</sup> evaluated parallel toxicity tests using Sacramento River water seeded with ammonium chloride and another seeded with SRWTP effluent to match the same ammonia concentrations. Dr. Werner's study showed that the test performed with SRWTP effluent was statistically 30-40% more toxic than the test performed with river water seeded with ammonium chloride. This may be an indication that there are additional toxicants present in the SRWTP effluent that are resulting in chronic toxicity to aquatic species.

<sup>1</sup> Foe, Chris, "Nutrient Concentrations and Biological Effects in the Sacramento-San Joaquin Delta", May 2010.

<sup>2</sup> Engle, D.L., & G. Lau (2010) Does Ammonia Exceed Toxicity Thresholds in the Upper San Francisco Estuary? A comparison of Ambient Data and Toxicity Thresholds for 1974-2010. Interagency Ecological Program (IEP) Annual Workshop, Sacramento, CA.

<sup>3</sup> State Water Contractors, Comments on Aquatic Life and Wildlife Preservation Issues Concerning the Sacramento Regional Wastewater Treatment Plant NPDES Permit Renewal, 1 June 2010.

<sup>4</sup> Teh, S.J., "Acute Toxicity of Ammonia, Copper, and Pesticides to Key Copepods, *Pseudodiaptomus forbesi* and *Eurytemora affinis*, of the San Francisco Estuary", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

<sup>5</sup> Werner, I, "Effects of Ammonia/um and Other Wastewater Effluent Associated Contaminants on Delta Smelt", presented at the 18-19 August 2009 Ammonia Summit at the Central Valley Regional Water Quality Control Board.

Inhibition of Diatom Primary Production. – In the Delta, low primary production rates and standing chlorophyll levels may be one factor contributing to the POD including the decline in diatom populations<sup>1</sup>. The causes of low primary production are not understood. Some areas with low primary production are not influenced by the discharger. Dr. Richard Dugdale from the San Francisco State University Romberg Tiburon Center presented evidence that an ammonia concentration greater than 0.056 mg N/l inhibited nitrate uptake by diatoms in Suisun Bay<sup>2</sup>. Ammonia-induced inhibition of nitrate uptake prevents spring algal blooms from developing when conditions are otherwise favorable<sup>3</sup>. High diatom filtration rates by the introduced clam *Corbula* and high turbidity levels are additional factors responsible for reducing diatom production and standing biomass in Suisun Bay. A combination of the above three factors (ammonia inhibition of nitrate uptake, depletion due to filtration by clams, and high turbidity levels due to standing chlorophyll) may contribute to the low diatom abundance now present in the Bay.

The San Francisco Regional Water Quality Control Board is responsible for conducting regulatory activities of water quality in Suisun Bay (part of the Delta system). The Executive Officer from the San Francisco Water Board has informed staff from the Central Valley Water Board that ammonia levels in Suisun Bay may be impairing the aquatic life beneficial uses in Suisun Bay by having a detrimental effect on primary production and phytoplankton species composition<sup>4</sup>. Staff from the San Francisco Regional Board monitored ammonia concentrations and algal species composition in Suisun Bay in the spring of 2010 to determine ammonia concentrations and the response of the diatom community. A written report is soon.

Nutrient monitoring by Central Valley Water Board staff have confirmed that the Central Valley watershed is an ammonia source to Suisun Bay<sup>8</sup>. Annual average ammonia concentrations increased 11.5-fold in the Sacramento River downstream of the SRWTP. More than three quarters of this ammonia (NH<sub>3</sub>) is nitrified to nitrite (NO<sub>2</sub>) and nitrate (NO<sub>3</sub>) before the water reaches Chipps Island 40 miles downstream of SRWTP. The channel off Chipps Island is considered here to be the entrance to Suisun Bay. Total dissolved nitrogen (TDN) concentrations (NH<sub>3</sub>+NO<sub>2</sub>+NO<sub>3</sub>) were constant between the SRWTP and Chipps Island. A stable concentration of TDN implies that there are no additional large sources or sinks of nitrogen in the Sacramento River channel between the SRWTP and Suisun Bay. The annual average ammonia concentration at Chipps Island was 0.1 mg N/l in 2009 and 2010<sup>3</sup>. The Dr. Richard Dugdale laboratory reports that ammonia begins to suppress nitrate assimilation in Suisun Bay at about 0.014 mg N/l with a complete shutdown at 0.056 mg-N/l<sup>10</sup>. Preliminary calculations suggest that ammonia loads from the Central Valley need to be reduced by a

<sup>1</sup> Sommer, T., C. Armor, R. Baxter, L. Brown, M. Chotkowski, S. Culberson, F. Feyrer, M. Gingras, B. Herbold, W. Kimmerer, A. Mueller-Solger, M. Nobriga, and K. Souza. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary. *Fisheries* 32(6):270-277.

<sup>2</sup> Dugdale, R. f. Wilkerson, V. Hogue, and A. Marchi. 2007. The role of ammonium and nitrate in spring bloom development in San Francisco Bay. *Estuarine, Coastal and Shelf Science*, 73:17-29

<sup>3</sup> Wilkerson, F. R. Dugdale, V. Hogue, and A. Marchi, 2006. Phytoplankton blooms and nitrogen productivity in San Francisco Bay. *Estuaries and Coasts* 29(3):401-416.

<sup>4</sup> June 4, 2010 letter from Mr. Bruce Wolfe, Region 2 to Ms. Kathy Harder, CVWQCB.

factor of 2 to 7 to eliminate the Central Valley's contribution to the diatom impairment in Suisun Bay<sup>1</sup>.

Ammonia concentrations are higher in the Sacramento River downstream of the SRWTP than in Suisun Bay. Two studies have been undertaken to determine the effect of ammonia on phytoplankton primary production in the Sacramento River and Delta. Both studies have found that ambient ammonia concentrations reduce nitrate uptake<sup>2</sup>. An additional complicating factor is that chlorophyll *a* concentrations decrease as the Sacramento River flows toward the Delta. The decrease in chlorophyll appears to commence above the SRWTP. The average annual decline in pigment between Tower Bridge in the City of Sacramento and Isleton is about 60 percent. The cause of the decline is not known, but has been variously attributed to algal settling, toxicity from an unknown chemical in the SRWTP effluent, or from ammonia. The SRWTP discharge cannot be cause of pigment decline upstream of the discharge point, and may not be contributing to the decline downstream of the discharge point. A manuscript for the Delta portion of the studies is in preparation by Dr. Dugdale (personal communication, Dr. Dugdale). A draft final report for the Sacramento River portion of the work has been received but this must be revised to address Stakeholder comments. Caution should be exercised in interpreting the freshwater phytoplankton results until all the final reports have been received and the entire package reviewed by phytoplankton experts in both the Delta and San Francisco Bay. In addition, more studies are needed to better characterize the decrease in chlorophyll concentrations as the Sacramento River flows to the Delta and determine the cause.

Shift in Algal Communities. - Dugdale *et al* hypothesize that larger algal cells (diatoms) are favored and grow faster in the nitrate-dominated river above the SRWTP while smaller phytoplankton species (flagellates and bluegreen algae) are competitively superior and grow faster at the higher ammonia levels present downstream of the SRWTP<sup>3</sup>. A higher growth rate should cause the smaller sized cells to gradually replace any diatom-dominated community downstream of the SRWTP.

In addition, Dr. Patricia Glibert hypothesizes that a change in ambient nitrogen to phosphorus ratios and in the oxidation state of the nitrogen species can also alter algal species composition<sup>4</sup>. According to Dr. Glibert, ambient nitrogen to phosphorus ratios in the Delta now favors blue-green algae and flagellates.

Dr. Peggy Lehman and T. Brown have documented that the algal community in the Delta has changed from a diatom to a flagellate/blue-green algal dominated community consistent with

<sup>1</sup>  $0.1/0.014 = 7$  and  $0.1/0.056 = 2$ .

<sup>2</sup> Parker, A., R. Dugdale, and F. Wilkerson. 2010. Biochemical processing of anthropogenic ammonium in river and estuarine water columns.

<sup>3</sup> *Ib.*

<sup>4</sup> P. Glibert, 2010. Long-term changes in nutrient loading and stoichiometry and their relationships with change in the food web and dominant pelagic fish species in the San Francisco Estuary, California. Review in Fisheries Science (accepted).

the predictions of Dugdale *et al.* and Glibert<sup>1</sup>. Whether this is the result of changes in nutrient concentrations and/or ratio is not known. Diatoms are assumed to be more nutritious to primary consumers like zooplankton than flagellates and bluegreen algae. Changes in algal food availability and its quality or a “bottom up” effect is one factor hypothesized to contribute to the POD<sup>9</sup>. Follow up studies are needed to determine the ecological effect of the change in nutrient concentrations and ratios on the phytoplankton community and whether nutrient control might cause the community to revert back to a diatom-based system.

Additional Studies – Dischargers are required to provide evidence that the discharge of wastewater to a receiving water is not impacting aquatic life downstream of the discharge, and to assess any impacts that may occur. There exists sufficient evidence that ammonia and nitrogen from the SRWTP discharge to the Sacramento River adversely impacts the aquatic ecosystem in the Sacramento River, Delta, and Suisun Bay to require the Discharger to conduct studies to determine the location and magnitude of existing and threatened impacts on the aquatic ecosystem from ammonia and nitrogen in the discharge from SRWTP. Studies should be coordinated with other NPDES dischargers of wastewater containing ammonia and nitrogen to the waterways of concern.

Dissolved Oxygen - The Basin Plan includes a water quality objective for dissolved oxygen of not less than 7.0 mg/L at any time for portions of the Delta, including the Sacramento River in the vicinity and downstream of the SRWTP discharge. Oxygen demanding substances, including carbon and nitrogen compounds, present in receiving waters are oxidized by microorganisms (bacteria and algae) resulting in the consumption of oxygen from the water column. If sufficient quantities of oxygen demanding substances are present in the water column, the rate of oxygen consumption may be greater than the reaeration of oxygen from the atmosphere and the dissolved oxygen levels drop in the water column. As the oxygen demanding compounds are oxidized and their concentrations are reduced, the rate of oxygen consumption falls and the reaeration acts to increase the dissolved oxygen levels in the water column. Because the typical response of the dissolved oxygen downstream from a discharge containing oxygen-demanding substances is to first decrease and then increase some distance downstream, the dissolved oxygen plot forms a characteristic “sag” curve.

The SRWTP discharges oxygen demanding substances, including biochemical oxygen demand (BOD) and ammonia. Current SRWTP BOD concentrations average 7.5 mg/L and the average effluent ammonia is 24 mg/L (as Nitrogen). The Discharger evaluated and modeled the dissolved oxygen demand from its discharge and reported the results in the “Low Dissolved Oxygen Prevention Assessment”, May 2010. The analysis was based on the

<sup>1</sup> Lehman, P. 1998. Phytoplankton species composition, size structure, and biomass and their possible effect on copepod food availability in the low salinity zone of the San Francisco Bay/Delta and Suisun Bay. IEP technical report No. 62. August 1998.  
Lehman, P. 2000A The influence of climate on phytoplankton community biomass in San Francisco Bay Estuary. *Limn and Ocean* 45(3):580-590  
Lehman, P. 2000B. Phytoplankton biomass, cell diameter, and species composition in the low salinity zone of northern San Francisco Bay Estuary. *Estuaries* 23 (2):216-230.  
Brown, T. 2010. Phytoplankton community composition: the rise of the flagellates. IEP Newsletter.

Streeter-Phelps Oxygen Sag Curve equation and includes oxygen depletion of carbonaceous oxygen demanding compounds and ammonia present in the water column. Additionally, the decay of organic nitrogen into ammonia is included in an expanded Streeter-Phelps model. The low dissolved oxygen prevention assessment (LDOPA)<sup>1</sup> model calculates daily averaged dissolved oxygen in the Sacramento River from the discharge of the SRWTP at Freeport, to the confluence of the Sacramento and San Joaquin Rivers (the Delta). The model uses river flow rate and temperatures input data developed for the Discharger's SRCSD DYNTOX model (SRCSD 2009) providing a 70-year period of record as a basis for the model simulations. The LDOPA model uses 7.0 mg/L, the Basin Plan water quality objective as the target to be achieved and calculates the maximum Ultimate Oxygen Demand (UOD) that can be discharged. The UOD is made of the combination of the primary oxygen demand substances in the effluent, BOD and ammonia.

The model was run for both 181 mgd (current design flow) and 218 mgd (previously proposed future flow). The model predicts the bottom of the dissolved oxygen curve is between Rio Vista and Emmaton about 35 miles downstream of the discharge point) and the beneficial use impacts from the Discharger are felt nearly 40 miles downstream. However, data collected for the Central Valley's Nutrient report showed the lowest dissolved reading at Hood (8 miles downstream) and Isleton (25 miles downstream). The Discharger will need to reduce oxygen demanding constituents in order to comply with the Basin Plan water quality objective. The LDOPA model showed a seasonal difference in the dissolved oxygen assessment because temperature and flow velocity are important factors in the rate of decay of oxygen. The Discharger proposes seasonal limits and the use of UOD in terms of pounds per day as the permit limit. The LDOPA model calculated the maximum UOD before the Basin Plan objective of 7.0 mg/L is exceeded. Based on a design flow of 181 mgd with a 99.9885% compliance (that is, compliance for all but one hour per year) the UOD would be as follows:

Flow (Q <sub>eff</sub> )	Percent Compliance (%)	Dry Season UOD (lbs/day)		Wet Season UOD (lbs/day)	
		AMEL	MDEL	AMEL	MDEL
181 mgd	99.9885	192,000	234,000	307,000	438,000

$$\text{Ultimate Oxygen Demand} = 8.34 \times [1.5(\text{BOD}_5) + 4.6(\text{Ammonia})] \times Q_{\text{eff}}$$

In addition to the UOD, BOD limits would be technology based limits for secondary treatment and ammonia limits would be based on the DYNTOX modeled mixing zones for acute and chronic toxicity and are as follows:

Parameter	Units	Effluent Limitations		
		Average	Average	Maximum

<sup>1</sup> More detailed information can be found in "Low Dissolved Oxygen Prevention Assessment", Larry Walker Associates, May 2010

		Monthly	Weekly	Daily
BOD	mg/L	30	45	60
Ammonia <sup>(1)</sup>	mg/L as N	37	----	47

1 - Based on acute mixing zone of 60 feet and chronic mixing zone of 350 feet as evaluated with DYNTOX dynamic model

The LDOPA model is based on limited ambient dissolved oxygen sampling conducted by the Discharger. The Discharger's 2009 ambient dissolved data at Hood did not show the dissolved oxygen concentrations less than the water quality objective of 7.0 mg/L 8 miles downstream of the discharge, at Hood. However, the Municipal Water Quality Investigations (MWQI) unit from the Department of Water Resources (DWR), the California Data Exchange Center (CDEC) managed by DWR, the Central Valley Water Board, and the City of Rio Vista have all collected dissolved oxygen data that shows at times, the dissolved oxygen concentration below 7.0 mg/L at various locations on the Sacramento River between the discharge point at Freeport and Rio Vista, 40 miles downstream. Because of this discrepancy in data, the Discharger expanded its monitoring from April to June 2010 for dissolved oxygen under rigorous quality assurance and quality control (QA/QC). Again none of the Discharger's collected dissolved oxygen concentrations dropped below 7.0 mg/L and compared with the continuous dissolved oxygen monitoring data collected by DWR at Hood, the Discharger's data shows an upward bias in the data, that is, the Discharger's data generally reports higher dissolved oxygen concentrations than data from other sources. At Central Valley Water Board staff's request, DWR checked their data collected at Hood from June 2008 through December 2009, for quality assurance and control and found in many instances the dissolved oxygen concentrations at Hood were below 7.0 mg/L.

The treatment processes or source control are required to reduce Dry Season ammonia and will be in place, therefore, Central Valley Water Board staff believes the Wet Season ammonia should be reduced by the same amount as the Dry Season. The Discharger did not offer compelling arguments to not reducing wet season ammonia limits. Therefore, Discharger's request for seasonal UOD requirements is not included in the permit.

Since conflicting data exist for dissolved oxygen concentrations in the Sacramento River, the Central Valley Water Board concluded that to protect beneficial uses it must be assumed that the River at times, is less than the water quality objective of 7.0 mg/L and the Discharger is currently using all the assimilative capacity in the Sacramento River from Freeport to Rio Vista for oxygen demanding constituents. This results in no assimilative capacity for any other cities and communities to discharge oxygen demanding constituents which is needed for them to grow. In contrast to the Discharger, most of the other cities and communities are implementing Best Practical Treatment and Control (BPTC) for their own facilities. The following communities have either constructed BPTC processes, will construct BPTC processes, or construct infrastructure to regionalize to BPTC facilities and would be affected by the lack of assimilative capacity for oxygen demanding constituents:

City of Roseville  
City of Woodland

City of Davis  
Community of El Dorado Hills



City of Placerville	City of Manteca
City of Stockton	City of Lodi
City of Galt	Community of Ironhouse
City of Tracy	City of Lincoln
City of Yuba City	Community of Olivehurst/Marysville
City of Live Oak	City of Auburn
City of Colfax	City of Vacaville
Community of North Auburn	Community of Granite Bay

Nitrosodimethylamines (NDMA) - Nitrosamines, mainly N-nitrosodimethylamine (NDMA), N-nitrosomethylethylamine (NMEA) and N-nitrosodiethylamine (NDEA) are highly mutagenic compounds that are suspected of carcinogenic activity to the human body.<sup>1</sup> NDMA is formed as a disinfection by-product from wastewater containing ammonia and/or nitrogen and chlorination. Historically, NDMA was used to make rocket fuel until contamination was found in air, soil and water. NDMA is produced currently only a research chemical. Laboratory detection levels for NDMA are greater than the water quality criteria and can range from 0.002 µg/L to 30 µg/L. From June 2005 to July 2008, 15 percent of effluent samples detected NDMA at levels greater than the water criterion with the maximum concentration over 100 times the primary MCL. The detection levels for sampling effluent are often too high to detect low concentrations of NDMA, therefore, this detection percentage may be underestimated. Similarly, the receiving water showed no detectable concentrations for NDMA, but the detection limits are too high to detect low concentrations. The California Department of Water Resources (DWR) is currently studying NDMA in the Sacramento-San Joaquin Delta. Preliminary data shows NDMA has not been detected at Hood, eight miles downstream of the discharge on the Sacramento River. However, DWR did find the NDMA precursors significantly greater (3-4 times) below the discharge compared with above the discharge<sup>2</sup> point.

Formation of NMEA and NDEA is a result of the reaction of methylethylamine (MEA) or diethylamine (DEA) respectively with chlorine in the presence of ammonia ions<sup>3</sup>. New studies indicate that NMEA and NDEA are also disinfection byproducts from treatment of wastewater and thus need to be monitored in the Monitoring and Reporting Program. Because the laboratory analysis EPA Method 521 identifies all three nitrosoamines, no additional costs are incurred with monitoring NMEA and NDEA.

<sup>1</sup> Abdrzejewski, P. "N-Nitrosomethylethylamine (NMEA) and N-Nitrosodiethylamine (NDEA), Two New Potential Disinfection Byproducts; Formation During Water Disinfection with Chlorine", Global NEST Journal, Vol. 7, No 1, pp 17-26, 2005.

<sup>2</sup> "Investigation into the sources of nitrosamines and their precursors in the Sacramento-San Joaquin Delta, California", Carol L DiGiorgio, California Department of Water Resources, Municipal Water Quality Investigations Unit. Poster presented from 9-11 August 2009.

<sup>3</sup> Abdrzejewski, P. "N-Nitrosomethylethylamine (NMEA) and N-Nitrosodiethylamine (NDEA), Two New Potential Disinfection Byproducts; Formation During Water Disinfection with Chlorine", Global NEST Journal, Vol. 7, No 1, pp 17-26, 2005.

Best Practical Treatment and Control – In order to reduce or eliminate ammonia and nitrogen from its effluent, nitrification and denitrification treatment processes are required. According to the “Technical Memorandum: Analysis of Costs and Benefits of Advanced Treatment Alternatives for the Sacramento Regional Wastewater Treatment Plant”, May 2010, the capital costs to nitrify and denitrify would be approximately \$3.0 million/mgd or for the 181 mgd WWTP a cost of \$760 million if a 1.4 maximum average month peaking factor is used.

State Water Resources Control Board Resolution No. 68-16 “Statement of Policy with Respect to Maintaining High Quality of Waters in California” requires:

*“Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.”*

Best Practical Treatment and Control (BPTC) is not defined in Resolution No. 68-16. However, in its “Questions and Answers” for Resolution No. 68-16, BPTC is interpreted as “best efforts” In State Water Board Order WQ 2000-07, the Board stated the “one factor to be considered in determining best practicable treatment and control would be the water quality achieved by other similarly situated dischargers and the methods used to achieve water quality”. The Discharger argues that they are not similar to other dischargers in that the Sacramento River provides adequate dilution to allow their discharge at treatment levels less than the majority of dischargers that discharge to the Delta directly or indirectly (by the tributary rule). However, as described above, the ammonia discharged by the Discharger is impacting beneficial uses of the Sacramento River, Delta and the Suisun Bay. Therefore, BPTC in the form of nitrification and denitrification is required to assure that a pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.